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locality keeps in heat and prevents a frost. A fog from a river or lake answers the purpose, and certain localities favored in this respect are famous for fruit. Gardeners sit up all night to keep fires going, not for the heat they produce, but to cover their gardens with a smoke blanket to keep the garden warm. In fact, smudges, not bright fires, do the work. Grape raisers, with thousands of dollars' worth of half ripened fruit, surround their vineyards with old straw to keep up smudges all night long to save their fruit; and in some localities tar is made ready for autumn protection as a regular part of the year's preparation. The damper the straw, provided it will burn, the more smoke it makes. Sprinkling a garden with water is said to be a preventive. Newspapers held down with clods are excellent to keep plants warm over night. Frost drainage has come to be well understood. Cold air condenses and becomes heavier. Thus it seeks the lowest place. If a vineyard, garden, or orchard be so situated that the cold air may drain or settle off into a nearby hollow, it has frost drainage. See FOG; DEW.

These winter nights against my window-pane,
Nature with busy pencil draws designs
Of ferns and blossoms and fine sprays of pines,
Oak leaves and acorns and fantastic vines,
Which she will make when summer comes again.
—T. B. Aldrich.

Frostbite, the effect of severe cold on some part of the body. The part affected by frost turns white, then purplish red. First aid should consist in rubbing the part with snow, ice or cold water to restore the circulation slowly. The return of the circulation causes heat and fever, and burning and itching in the affected part. In severe cases the frozen parts may die and decay. Prompt surgical treatment is necessary in such cases.

Insert Standard Educational (Budke, 6-6)

Froude, frood, **James Anthony** (1818-1894), an eminent English writer. The Froude family has been connected with the Church of England for generations. James Anthony was educated at the University of Oxford. In 1892 he succeeded the historian Freeman as regius professor of modern history in that institution. During a long and busy life he wrote many books, including a score or two that find place in public libraries. His most noted work is the *History of England from the Fall of Wolsey to the Death of Elizabeth.* It is popularly known as *Froude's History of England.* Its appearance created a sensation. The writer appeared to take delight in shocking the prejudices of his readers. His style is brilliant, but he writes with a degree of prejudice unbecoming a historian. The principal characters in the period which he covers are Henry VIII, Elizabeth, and Queen Mary. His attitude toward Queen Mary is exceedingly hostile. Even those who do not approve her methods feel that he has not done her justice. He aims to vindicate the much married Henry VIII, but the popular verdict is that he has placed Henry in too favorable a light. His estimate of Elizabeth is accepted as his best work. It is pretty well agreed that in her case he has been fair.

Froude was an intimate friend of the Carlyles. Manuscripts and letters were turned over to him for such use as he might deem proper. His *Reminiscences of Thomas Carlyle and Memorials of Jane Carlyle* have given rise to a great deal of controversy. They give an inside view of the Carlyle family, and are read with the deepest interest. Some readers take the view that the private life of eminent people, like the Carlyles, should not be made public. Others sustain Froude in his position that the public is entitled to have all that is known of the lives of celebrated people.

Fruit, the name of the structure, usually fleshy, that ripens in connection with the seeds of seed-bearing plants. In its narrow significance, the term applies only to the edible products of various plants, as apple, tomato, plum, etc. Nuts are the fruit of the trees that bear them, but are almost universally classed by themselves; thus we speak of fruits and nuts.

Fruit-growing is an ancient, wide-spread and important industry; and in North America, ranking first is fruit production, the profits from this industry are very great. The middle and eastern United States and Canada, are supplied from Florida and California with subtropical

fruits throughout the year, while from the Gulf States strawberries and other fruits go into the North long before the beginning of spring. The United States annually imports and exports thousands of dollars worth of fruit. The 1921 value of the American commercial fruit crop was roughly six and a half billion dollars. In this year Texas and California stood first and second respectively as fruit producers.

Fruit, fresh and preserved, constitutes an important item of the food of many—almost all—nations. Fruit juices contain acids and salts that are very beneficial to the human system; dried fruits, because the water has been evaporated, have a higher nutritive value comparatively to their bulk than have fresh fruits; and preserved fruits, because of the process they are put through, contain the greatest amount of sugar.

Fuchsia, fŭ′shĭ′ä, a tropical plant belonging to the evening primrose family. There are thirty species, chiefly native in Mexico, Chile, and Peru. Some of the species are small shrubs; one in New Zealand is a tree twenty feet high; but our house plants are usually herbs. Fuchsias are easily grown from cuttings. Gardeners recommend two joints, one to be thrust underground for rooting, the other to stand above ground for branching. Spring cuttings make winter flowers. They should be left in pots out of doors as late as possible, and when brought in should have good light and plenty of water, but should be screened from bright sunshine. The fuchsia was named for Leonard Fuchs, a Bavarian botanist connected with the University of Tübingen, 1501-1566. The fuchsia is known also as lady's eardrop. It is too delicate for outdoor growth, but it is a favorite conservatory and window plant. The foliage is attractive. The flowers hang singly, one from the axil of each leaf, or else from the tips of the branches. The calyx is composed of four long, brightly colored sepals, purple, rose, or white. The corolla is composed of four longer, usually darker petals. The stamens and style hang lower yet. They also are gayly colored, giving to the entire flower a beautifully rich, attractive appearance.

Fuel, coal, wood and their derivations, coke and charcoal, are the most important solid fuels; of these anthracite coal is the most valuable. Its relation to wood as a heat producer is two and one-half to one, that is, it takes two and one-half pounds of wood to produce as much heat as one pound of anthracite. Petroleum and its derivations, gasoline and kerosene, are the most valuable liquid fuels. Alcohol and various liquid vegetable oils are also used as fuel for specific purposes. The heat value of oil is nearly twice that of coal. Natural gas and coal gas are the gases used as fuel. Natural gas is the ideal fuel. It has fifty per cent. greater heat value than coal gas.

Fugitive Slave Laws, in American history, acts granting slaveholders special or additional facilities for the recovery of escaped slaves. A fugitive slave law enacted by Congress in 1793 depended for its execution on state courts and state officials. It was never effective, and a supreme court decision robbed it of half its force. The underground railway system, described elsewhere, ran off slaves with system and dispatch. Not less than 5,000 persons were engaged in aiding slaves to escape. Between 1830 and 1860 it is thought that no less than 60,000 slaves escaped, a "property loss" of possibly $2,000,000 a year. The courts of the Northern States very early refused to aid the pursurer or punish the aider. With public sentiment rising high in favor of the runaway slave, the Northern courts were slow to enforce the undoubted provisions of law for the return of fugitives.

To allay Southern resentment and hold the Union together, Henry Clay, senator from Kentucky, brought forward a plan of settlement in 1849 which proposed the admission of California as a free state, the establishment of territorial government in New Mexico and Utah without reference to slavery, the abolition of the slave trade, but not of slavery, in the District of Columbia, and lastly, a new and stringent fugitive slave law. After a famous debate the proposed measures were referred to a committee of thirteen. The committee re-

ported the "Omnibus Bill," a bill forbidding the sale of slaves in the District of Columbia, and a third bill providing for the capture and return of fugitive slaves. All three bills were passed and became laws in 1850. The Fugitive Slave Law of 1850:

1. Provided that United State commissioners might give a colored man or woman into the custody of any person who claimed the negro as a runaway slave.
2. Provided that the negro might not be heard in his own behalf, being held incapable of giving testimony.
3. "Commanded" all good citizens, when summoned, to aid in the capture of the slave and his delivery to the lawful owner.
4. Prescribed penalty of fine and imprisonment for those who harbored fugitive slaves or put an obstacle in the way of recapture.

In other words, the new act placed the entire machinery of the national courts at the disposal of the slave owner and required all citizens not merely to refrain from opposing the capture of a runaway, but to take hold and aid and assist in the negro's recapture and safe custody if called upon to do so. Under the provisions of this act negroes who had lived in the North in security, as they supposed, for many years, even men who were supporting families in a self-respecting way, were hunted down by "slave catchers"—"man hunters"—and were dragged into the United States courts to be remanded into slavery. It was not an edifying spectacle to see a marshal of the United States leading an inoffensive colored person through the streets of a Northern city. Riots followed, and more than one fugitive was rescued from the clutches of the law. In the case of Shadrach, a negro brought before the United States commissioner in Boston in 1851, a bystander wrote, "We heard a shout from the courthouse continued into a yell of triumph, and, in an instant after, down the steps came two huge negroes bearing the prisoner between them with his clothes half torn off, . . . and they went off toward Cambridge, like a black squall, the crowd driving along with them and cheering as they went."

Public feeling ran so high that nearly all the Northern States passed "personal liberty laws," interfering with the operation of the national law. In many parts of the North it became about all a man-hunter's life was worth to be caught. The Fugitive Slave Law was practically nullified. Mrs. Stowe wrote *Uncle Tom's Cabin* and events drove on at high speed toward the Civil War. Schoolboys who read of the Nullification Act of South Carolina should understand that nullification was not altogether a Southern doctrine, nor altogether a Southern practice.

As a matter of history, it is well to know that, in demanding the return of their slaves, the Southern slave owners were acting quite within their legal rights as secured by Paragraph 3, Section 2, Article IV of the Constitution:

> No person held to service or labour in one state, under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labour, but shall be delivered up on claim of the party to whom such service or labour may be due.

Fujiyama. See FUSIYAMA.

Fulda, a city on the river of that name about fifty-three miles northeast of Frankfurt-on-the-Main. It is a manufacturing town of about 13,000 inhabitants. Fulda is noted as the site of an ancient abbey, founded by Boniface in 744. This abbey was a center of missionary work among the Germans. Boniface was buried in the old abbey. A copy of the gospels in his own handwriting is shown.

Fuller, Margaret. See OSSOLI.

Fuller, Melville Weston (1833-1910), an American jurist, for twenty-two years chief justice of the U. S. supreme court. He was born in Augusta, Maine, and studied at Bowdoin and at the Harvard Law School. He was admitted to the bar in 1855, and for about a year edited the Augusta *Age,* removing then to Chicago where he practiced law for thirty-two years. He served in the state legislature for a time and was a member of the Democratic national cenvention eight times in succession, the last time in 1884, after which he

withdrew from active politics. Four years later President Cleveland tendered him the position of chief justice which he held until his death.

Fulling, in the manufacture of textiles, the process of shrinking or condensing woolen and worsted fabrics to render them firmer and stronger. The primitive method of fulling cloth was to tread it with the bare feet in water. It is said that our surnames of Fuller, Walker, and Tucker all came from the fact that those who performed this labor, variously called fulling, walking, and tucking, were called by these names.

The present process of fulling is understood more readily by one to whom the condition of woven fabrics as they come from the loom is familiar. Many of the fabrics admired and found serviceable by reason of their close, firm weave appear loose, elastic, and almost flimsy before the fulling process.

Fuller's Earth, a clay in the form of powder, which is used to clean articles of clothing and to remove grease and oil. It is very porous, and so when applied dry on soiled articles of clothing and left for a time it will absorb the oil and grease spots, after which it is brushed off. It was formerly used in factories to absorb the oil or grease with which woolen goods had been treated, but other methods are now used. In mineralogy, fuller's earth is known as "smectite."

Fulton, Robert, (1765-1815), the earliest builder of a successful steamboat. He was a native of Pennsylvania. In 1786 he went to England to study portrait painting. After a few years he turned his attention to engineering and inventions. He acquainted himself with the latest attempts at steam navigation in England and France. He is credited with the invention of the torpedo, which he vainly endeavored to bring to the attention of Napoleon. In 1806 he returned to America full of his new ideas, and began experimenting in the application of steam to the propelling of boats. In 1807 his steamboat, the Clermont, made the trip successfully from New York to Albany, and ran with regularity for some time thereafter on the Hudson River. This was the beginning of permanent steamboat navigation. See STEAMBOAT; FITCH.

Fundy, Bay of. See TIDES.

Fungi, fŭn′jī, singular **Fungus,** a class of colorless plants, including mushrooms, puff balls, rusts, smuts, mildews, and yeast. Being without the green of ordinary plants, they cannot feed on true soil, however rich, but grow in plant and animal tissue, living or dead. They play a part in turning animal and plant matter, called organic matter, back into soil, and are useful. Were it not for fungi and bacteria, which see, we should have no decay, or way of turning plants and animals back into soil again. On the other hand, fungi do much damage. The decay which attacks a bruised apple, plum, orange, or other fruit is a fungus. Mildew is a fungus. Potato scab and the stain that attacks rose leaves are fungi. There are, in all, probably not less than 250,000 distinct fungi, many of them so small as to be seen only under the microscope.

Funston, Frederick (1865-1917), an American soldier, born at Carlisle, Ohio, and educated at the University of Kansas. In 1896 he joined the insurgents in Cuba under General Garcia. At the outbreak of the Spanish-American War, Funston became Colonel of the Twentieth Kansas Volunteers and was ordered to the Philippines. In March 1901, he led a company to Northern Luzon, and captured Aguinaldo (which see). For this achievement he was appointed major-general by President McKinley. He had charge of the military forces protecting San Francisco after the earthquake in 1906. In 1914 he was placed in command of the United States forces at Vera Cruz, and in 1916 was placed in command of the troops along the Mexican border.

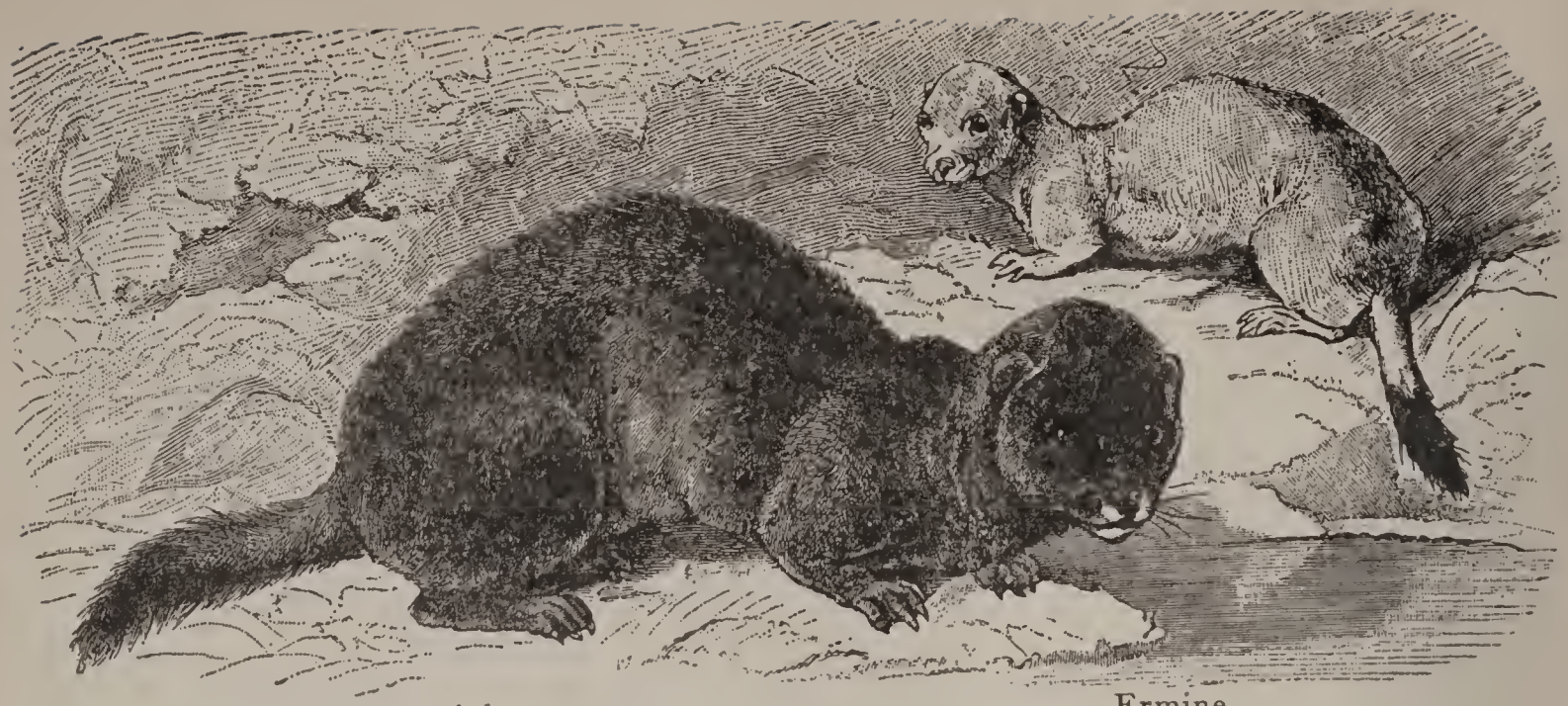
Fur, the short, fine, soft coat of certain animals. Fur differs from hair about as down does from feathers. Many animals have a double coat of hair and fur. Many furs are prepared for market by plucking out the long hairs. Fur is a nonconductor of heat. It makes the warmest clothing known. The colder the climate in which the animal lives, the thicker its

Russian sable.

Common weasel. European Polecat. Ferret.

Pine marten. White-breasted marten.

FURBEARING ANIMALS.



European mink. Ermine.

European badger.

Fisher. Glutton.

FURBEARING ANIMALS.

fur. Like down, fur is also a non-conductor of water. Although fur-bearing animals remain under water for a considerable length of time, the moisture does not reach the skin.

The finest furs are those of the sable, ermine, fur seal, beaver, and otter. From time immemorial garments of rich fur have been considered the most elegant wearing apparel. Australia, India, South America, South Africa, and mountain altitudes everywhere are inhabited by fur-bearing animals. The world's great supply of fur, however, has been obtained from the northern parts of Asia, Europe, and North America. The New World, in particular, has been the paradise of the hunter. The French were the first to buy furs from the Indians of the St. Lawrence Valley. The Dutch traded with the Indians of the Hudson and the Mohawk. Later, however, the English dispossessed both of these nations and practically monopolized the fur trade of North America.

Fur-bearing animals have been hunted with persistence for thousands of years. Some animals, as the fur seal and the American bison, are practically extinct. Others are far from extermination. The present annual take of furs in North America is estimated about as follows: muskrat, 3,000,000; skunk and raccoon, 500,000 each; mink and opossum, 250,000 each; bear, 15,000; silver fox, 2,000; other foxes, as the blue, cross, gray, and red, 7,000 to 60,000 each.

Fur Farming. Raising black and silver foxes was begun in Prince Edward Island several years ago and the industry has proved very profitable. It has extended to Quebec and Nova Scotia. Fur farming now includes raising skunks, muskrats and minks, and it is practised in the northern part of the United States as well as in Canada.

By cross breeding foxes a variety of skins can be produced, and these varieties cannot be imitated by the most skillful workmen.

Formerly London and Leipsic were the great fur centers of Europe, but the Great War practically closed these markets and gave an impetus to fur manufacturing in the United States. Saint Louis is the chief center of the industry. Saint Paul and Minneapolis receive most of the skins taken by trappers throughout the Northwest and New York is also an important fur center. Prices vary, but the following are the prices usually received by the trappers for skins in normal times.

Beaver	$ 5.00	to	$25.00
Chinchilla	4.00	to	12.00
Red Fox	1.00	to	8.00
Mink	3.00	to	10.00
Sea Otter	Up	to	3,000.00
Racoon	1.00	to	5.00
Skunk	1.00	to	3.00
Silver Fox	2.00	to	50.00
Lynx	5.00	to	35.00
Marten	5.00	to	20.00
Otter	10.00	to	35.00
Sable	50.00	to	60.00
Seal	10.00	to	20.00
Muskrat	.10	to	.50
Squirrel	.05	to	.15

The preparation of furs from the time the pelt leaves the animal's back until it is ready to be made into garments involves many interesting processes. With the exception of the furs of the Persian lamb, the astrakhan, and the lynx, in the dressing of which Leipsic excels, and of the seal, in which London holds supremacy, the United States leads the world in the tanning and dressing of fur.

As sent in by the trapper the skins are "raw" and stiff. They are first softened, then "tubbed," which means left in salt and water over night. They are wrung out of this bath and handed over to the "flesher." The flesher sits astride a narrow bench, in the end of which knives are set in such a position that the worker may remove by their aid any bits of flesh or fat clinging to the pelt. George S. Cole in his *Encyclopedia of Dry Goods* describes the next process to which the skins are subjected: "From the flesher the skins go through an oiling process, in which pure creamery butter is liberally slapped on the pelt. In this condition they are placed in heavy oak barrels, which are partly covered with cloth. In these barrels, half-naked men stand waist deep, and tread the skins day after day. With their bare feet they work the butter into the fur; and the heat which emanates from their bodies forms a most important item

in the curing of the skins. The effect of the heat and butter is to render the skins soft, supple, and glossy. Only a few pelts, from ten to fifteen, according to size, are trodden on at one time.

"When the butter has been worked in thoroughly the skins are removed to a drying-room and spread out upon the floor. At the proper stage of dryness they are taken to the sawdust-room. This sawdust in reality is pulverized wood, of about the fineness of sugar. Sometimes it is of mahogany, and again of rosewood. For different sorts of fur different dusts are used; wood dust for the darker furs, and flour and marble dust for ermine. As only ten per cent of the butter is actually absorbed by the pelt, the rest clinging to the fur, the dust has to be worked very thoroughly into the greasy fiber in order to cleanse it. This is accomplished usually by placing a dozen or so skins together with a copious supply of wood dust in a big revolving drum, heated by means of steam to about blood heat. The furs and dust are revolved rapidly until sufficient dust has been taken up, when they are removed and deftly shaken. As the butter adheres to the dust, the former is thus gotten rid of. The skins are next beaten gently and then given over to the comber. He brushes up their silky coats and trims them into a symmetrical shape, when, after being dyed, they are ready for making into garments."

The long outer hairs are plucked or left on, according to the use to which the fur is to be put. The dyeing must be done with care, lest the dye reach the skin in sufficient quantity to lessen its durability. It is the successful dyeing of fur which has made it possible to prepare low grade furs to imitate fine and costly articles. At the present time in Paris and London a large industry is carried on in the transformation of rabbit skins into imitation furs. Millions of rabbit skins are dressed and treated yearly, and are sent over the world as seal, Siberian squirrel, beaver, marten, mink, and many other expensive furs.

See articles on HUDSON BAY COMPANY and the various fur-bearing animals.

Furies, called also the Erinyes (ĕ-rĭn′ĭ-ēz) and the Eumenides (ū-mĕn′ĭ-dēz). In Grecian mythology, the three goddesses who punished crimes, especially secret crimes which have escaped public justice. Their names were Alecto, the unresting; Megaéra, the jealous; and Tisiphone, the avenger. Their work on earth was to torment the guilty with mental sufferings. In the lower world they punished sinful souls. The name Erinyes, which is their most ancient appellation, signifies the hunters of criminals. The later name, Eumenides, means the soothed goddesses, given as was another name meaning the venerable goddesses, for euphemistic reasons, the Athenians having such a horror of the Furies that they feared almost to mention them. In Aeschylus' drama, *The Eumenides,* fifty Furies were introduced, accompanied by Horror, Paleness, Terror, Rage, and Death. See FATES.

These terrible beings were described as clothed in black robes, with serpents instead of hair, with fingers like claws, a whip of scorpions in one hand and a burning torch in the other, an outstretched tongue, and eyes dripping with gore.—*Americana.*

Furlong, an English measure of distance. Taken literally, it means a furrow long, or the distance across a customary field. The term gradually acquired a definite meaning of forty rods, or one-eighth of a mile. It is used by writers to translate the Greek stadium.

Furlough, fûr′lo, temporary leave of absence granted to a soldier or sailor. To protect himself against the charge of desertion, a soldier is entitled to receive a written furlough which he must carry on his person. The same permission granted to an officer is called leave of absence. In the volunteer service furloughs are granted frequently in case the services of soldiers are not required immediately, but may be recalled in case of emergency. During the Civil War soldiers who were wounded and rendered unfit for duty, but who were yet able to travel, were granted furloughs not infrequently with permission to go home and recuperate until they were sent for.

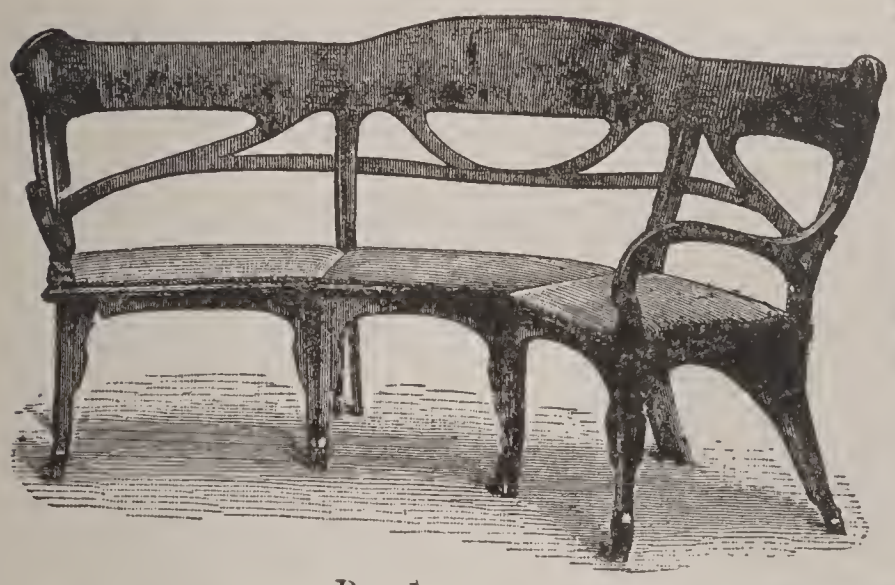
Furnace. See HEATING AND VENTILATING.

Furnace Blast. See IRON.

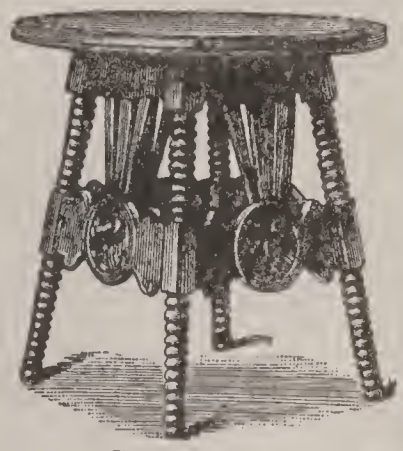
Hall chair.

Arm chair.

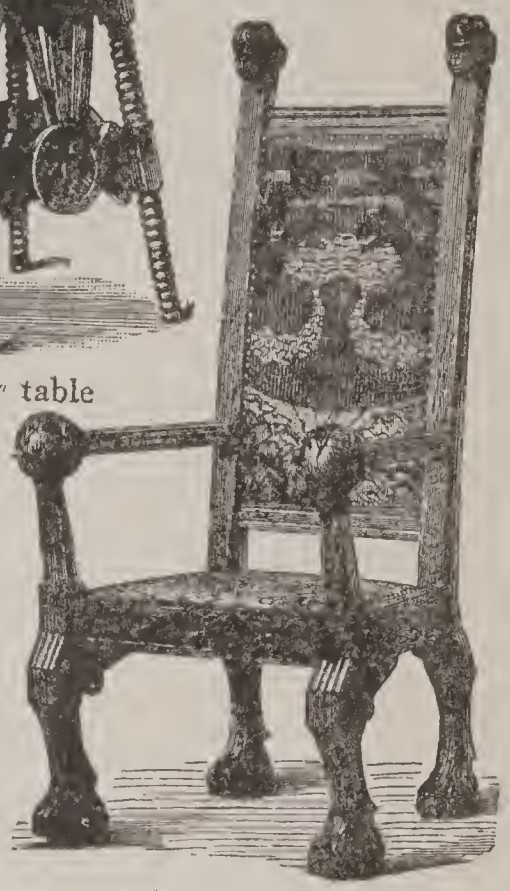
Library chair.



Bench.



Center table



Arm chair.

Cabinet.

Reception chair.

Parlor chair.

Arm chair.

MODERN GERMAN FURNITURE.

Furniture, the movables required for use or ornament in a house, office, or place of assembly. In an older sense the term was applied to almost any outfit, as the trappings of a war-horse, the rigging of a ship, or the appliances of a printing office.

Aside from stoves, utensils, and furnishings, such as bedding, curtains, and rugs, the most conspicuous articles of furniture are chairs, tables, and bedsteads. No doubt, stools preceded chairs. For tables our Anglo-Saxon forefathers laid rough plank on trestles. Benches and chests and boxes may have suggested couches and sofas. Very likely the first bedstead may have been a heap of boughs, or more likely a platform of poles. The early settler in Kentucky built a bedstead of poles in one corner of his shanty. His table was made of hewn planks set on poles for legs. To make a chair, he set a two-foot block on end, or, if he had an augur, he split his round block in two and gave it four legs. The pelt of a coon, deer, or black bear served well by way of upholstery.

Judging from sculpture, paintings, and names, the ancients gave no little attention to furniture. The Assyrian artificers were skillful in metal work. The wealthy Egyptian prince had furniture of polished woods inlaid with gold and ivory, and draped with expensive cloths and skins. Couches, rugs, stools, sofas, and bedsteads of wicker work and bronze added to the pleasure and comfort of the pharaohs. Couches, chairs, tables, and huge ornamental candlesticks were known to the Greeks and Romans. The wealthy had furniture richly inwrought with gold and ivory and tortoise shell. Their couches consisted of frames strung with cords and covered with mattresses.

The furniture store with a stock of readymade goods is a modern idea. Furniture-making, like the making of shoes and of clothing, has passed through several stages. It is only within a century that dealers began to make up furniture in advance of orders. The noted makers of France, Germany, and England of colonial times filled orders from individual persons of wealth. Ordinarily people had their supply of furniture made by the village joiner.

One of the most celebrated English furniture makers was Thomas Chippendale of London, who flourished about the middle of the eighteenth century. His designs were based on French and Chinese models. His chairs have curved or slender legs. The sides and back are formed of carved ribbon or lattice work. About this time, mahogany became a favorite wood.

Well-to-do colonists brought furniture to America with them. The Pilgrims brought chairs from Holland. In colonial days men like John Adams and John Hancock of Boston and the planters of Virginia sent orders to England for new furniture. In that day of leisurely hand work and slow sailing vessels, months or even years passed before some incoming ship brought the articles desired.

The earlier furniture factories in the United States were hand shops. Steam, that is to say, power machinery, was introduced about the close of the War of 1812. The excellence of American woods has given our manufacturers an advantage. Several articles are recognized as American in design. The bureau is an American combination of two European articles known as a chest of drawers and a dressing table. The upright folding bed is American. The most distinctive contribution, however, is the American rocking-chair. This and the American roll-top office desk are our most popular specialties abroad.

The present American centers of furniture making are New York, Chicago, Grand Rapids, Philadelphia, Cincinnati, St. Louis, and Boston. There are indications that Grand Rapids, Michigan, may become the national center of the trade. Two annual fairs or trade sales are held here in January and July. The last census placed the total annual product for the United States at $153,168,309.

As to woods, the mahogany and walnut of earlier days have been succeeded by oak, ash, maple, and other light-colored woods. Designs are shifting in the direction of plainness and strength. Manufacturers seek beauty of shape and of wood, rather than dust-gathering ornaments and gilding. Of late enameled iron with brass trimmings has become popular for bedsteads.

Furze. See GORSE.

Fusion. See MELTING.

Fustian, fŭs′chan, formerly a costly textile of linen and wool, woven with a pile, or heavily napped. It was in use during the thirteenth and fourteenth centuries for priests' robes and women's dresses. Gradually the fabric came to be imitated in linen and cotton, and finally in cotton alone. The strength and durability of fustian made it suitable for laborers and servants, and its use was confined at one time to this class of persons. At the present time the word fustian is a general term including several different fabrics of similar qualities. Moleskin, velveteen, corduroy, beaverteen, and thickset are fustian. From the fact that fustian was thick and stiff, increasing the apparent size of the wearer, the word came to be used in a figurative sense to designate a florid style of speaking or writing, in which words and phrases are more high-sounding than the subject warrants. So the word *bombast,* originally meaning cotton batting, which is used for padding, has acquired a similar, and even stronger figurative meaning.

> Prithee, let's talk fustian a little, and gull them; make them believe we are great scholars.—Ben Jonson.
>
> Bombast is commonly the delight of that audience which loves poetry but understands it not.—Dryden.

Fusiyama, or Fujiyama, fōō-jē-yä′mah, the sacred mountain of Japan. Rising as it does over 12,000 feet straight out of the sea on one side and sloping gently to its snow-capped cone on the other, it is not surprising that an artistic people like the Japanese have grown to worship the beautiful mountain. Every summer when its crown is free from snow, thousands of white-clad Buddhist pilgrims climb its sides as an act of worship, believing that they will be blessed for so doing by the "spirit of the mountain." Love of Fujiyama has become a very part of the people. There is hardly a fan, a tea-cup, a screen, a bit of pottery, or any other piece of Japanese art but that bears somewhere an image of the "Matchless Mountain" with its pure crown of snow. It is a volcano dormant since 1707, with a crater 500 feet deep and about two and one-half miles in circumference. Five paths lead to the summit from different sides.

G

Gabardine, a long, loose, coarse cloak, with or without sleeves and a hood. It was an outdoor garment worn by peasants and workmen and by Jews. The laws of the Middle Ages forbade the Jew to wear the cloak of a gentleman; hence the gabardine carried with it the idea of social inferiority.

> You call me misbeliever, cut-throat dog,
> And spit upon my Jewish gabardine,
> And all for use of that which is mine own.
> —*Merchant of Venice.*

> Here was a Tangier merchant in sky-blue gabardine with a Persian shawl twisted around his waist.—Aldrich, *Ponkapog to Pesth.*

Gabinian Law, in Roman history, a name given to two distinct laws passed by the Senate.

1. A law, passed in 67 B. C., investing Pompey with unlimited command for the space of three years over the Mediterranean and its coasts for fifty miles inland. He was given control also of the public treasure of the provinces. Under authority of this law, Pompey cleared the Mediterranean of pirates.

2. A Roman law, passed 58 B. C., which forbade loans of money at Rome to legations from foreign countries. It was enacted to prevent the "raising of funds with which to bribe the senators."

Gabion, a military term from the Italian, used to designate a hollow wicker cylinder or basket without top or bottom. Soldiers desiring to intrench themselves quickly formed willow gabions in a place of shelter, and carried them forward under fire or perhaps in the night. Two rows of gabions, set so as to break joints and filled with earth, formed a secure breastwork against musketry. The advantage of gabions lay in the fact that they afforded concealment and could be filled with earth in far less time than would be required to throw up an embankment of equal height. See BLOCKHOUSE; VAUBAN; FORT.

Gable, the end wall of a house, especially the triangular portion above the level of the eaves, and included between the sides of the roof. In medieval cities, particularly those of the Netherlands and Germany, houses were built customarily with their gables turned toward the street. The Norman-French introduced the same custom into this country. These gables were adorned frequently with rich wood carvings and are still a source of pleasure to artists and tourists. In Edinburgh stone gables grow narrow by a series of steps, like a flight of stairs. Owing to the convenient perches they afforded for crows they are called corbie steps, corbie being Scotch for crow. From the builder's point of view gables came into use in connection with the Gothic style of architecture.

Gaboriau, gä-bō′rē-ō, **Emile** (1835-1873), a French novelist. He was born at Saujon. He was by turns a soldier, a lawyer, a priest, and a writer for the Paris papers. In 1866 he made a hit by *The Lerouge Affair,* a story contributed to the story insert of *Le Pays.* Gaboriau was a writer of detective stories. His most famous creation is *Monsieur Lecoq,* the prototype, it may be, of Sherlock Holmes.

Gabriel, in Jewish angelology, one of the seven archangels. The Hebrew word means "God is my strong one," and it would seem that Gabriel's special duty was to reveal the will of God. In the book of Daniel he brings to the prophet the interpretation of his vision. In the gospel of Luke he announces to Zacharias the birth of John the Baptist, and to Mary the birth of Christ.

In Jewish literature of later date than the Bible Gabriel appears sometimes as the Angel of Death. In the Talmud he is represented as presiding over thunderstorms. The Koran teaches that Gabriel, Michael, Uriel, and Raphael were the four angels whom God most favors, and that it was Gabriel who dictated the Koran to Mohammed, "with the sound of bells."

Gadfly, a name applied to large flies which goad or sting domestic animals,

more commonly called horseflies in this country. The term is improperly applied to many botflies. Gadflies have wonderful powers of flight, being able to keep up with the swiftest quadruped without apparent effort. The sting frequently draws large drops of blood, and is exceedingly painful. Naturalists inform us that the male gadfly is satisfied with such nourishment as he can sip from weeds and flowers, but that the female is savagely eager to feast on blood. Gadflies proper are closely related to the smaller yellow-barred pest of the woods known as the deer-fly. See FLY.

Gadsden, Alabama, an industrial city and the county seat of Etowah County, is on the Coosa River and on the Southern and three other railroads, 56 miles northeast of Birmingham. This city is the center of a very productive timber and mineral region, and contains manufactories of flour, steel, sash and doors, wagons and handles. There are large blast furnaces and machine shops. The public school system and library of Gadsden are modern and adequate. Population, 1920, 14,737.

Gadsden Purchase, a tract of land acquired from Mexico by purchase. The treaty was negotiated by James Gadsden. The territory acquired lies within the present boundaries of Arizona and New Mexico. It is about 120 miles wide and extends along the southern bank of the Gila River from the Colorado to the Rio Grande, comprising in all about 45,535 square miles. The treaty was negotiated in 1853. It was ratified in 1854. The United States government paid Mexico $10,000,000. The Southern Pacific Railway traverses the tract from east to west. The sale was one of the causes that led to the downfall of Santa Anna.

Gadski, Madame Johanna (Madame H. Tauscher) (1872-), a German operatic soprano whose beautiful and powerful voice has thrilled thousands of opera lovers in Europe and the United States. Born at Anclam, Prussia, she was educated at Stettin, and made her debut in Berlin in 1889. In 1892 she married H. Tauscher, an Austrian army officer, but continued her musical career. Madame Gadski sang the principal Wagnerian roles in Mr. Damrosch's Germany company in 1894. Her success was immediate. She made her American debut in 1895 at the Metropolitan Opera House, New York, as Elsa in *Lohengrin.* In 1898 she became a member of the Metropolitan Opera Company, subsequently appearing in all the important American and European cities. Madame Gadski has won the Bavarian and American gold medals for art and sciences, and the gold medal of the National Institute of Social Science. She retired from the stage in 1917, but reappeared in 1921 in the Wagnerian program of the New York Philharmonic Society.

Gadwall, or **Gadwell,** a large gray fresh-water duck, not quite as large as the mallard. It inhabits marshes and is found in the eastern United States, in the Middle West, and especially in Florida. It breeds from Kansas northward. In winter it migrates south as far as the Gulf of Mexico. It is also found in Europe. It is a favorite game duck, and its flesh is considered a great delicacy.

Gaea, or **Ge,** jē′ä or jē, in Grecian mythology, the goddess of the earth. She seems to have been regarded as the personification of the earth. She is described as the first born of Chaos. She became the wife of Uranus, personification of the heavens, and the mother of the Titans. The worship of Gaea extended throughout all Greece, and many temples and altars were erected in her honor. She was an oracular goddess, and the oracles of Delphi and Olympia are believed to have at one time belonged to Gaea. She was called Tellus among the Romans. In some accounts, Eros, the god of Love, is born of Chaos, and creates the earth and persuades Gaea to marry Uranus. See EROS.

Gaelic. See CELT.

Gage, Thomas (1721-1787), an English general, and Colonial military governor of Massachusets, was born at Firle, Sussex. Entering the army, he received a lieutenancy in 1741, and accompanied Braddock to America in 1754 as lieutenant-colonel of the Forty-fourth Foot. In the latter part of Braddock's celebrated march against Fort Duquesne, General Gage commanded the advance guard. In 1758 he raised a

regiment of provincial troops and commanded at the siege of Ticonderoga under Amherst. Amherst made him governor-general of Montreal in 1760, and from 1763 to 1772 General Gage was chief of the English forces in America. After a sojourn in England, he was ordered to Boston to enforce the Boston Port Bill and the Stamp Act. General Gage could not frighten the Bostonians ,even though his soldiers carried on a spite war against the children of the town. In 1774 he was appointed governor of Massachusetts, again became commander of the English forces in America, and caused the battle of Lexington by sending a force to Concord to destroy the provincial stores and capture John Hancock and Samuel Adams. General Gage ordered the disastrous assault upon Bunker Hill, and for this was recalled to England, and was succeeded by Howe.

Gail Hamilton. See DODGE, MARY ABIGAIL.

Gainsborough, Thomas (1727-1788), an English painter. He was born in Sudbury, Suffolk, and died in London. His father was a wool manufacturer. Young Gainsborough went up to London in his fifteenth year, where he studied engraving and drawing. In 1745 he returned to Sudbury and set up a studio as a portrait painter. Fifteen years later he removed to Bath, then a fashionable resort, where he won reputation as a painter of portraits. In 1774 he left Bath for London. Gainsborough was one of the original thirty-six members of the Royal Academy. He painted over two hundred portraits. Many of these are preserved in the galleries of Dublin, Glasgow, Edinburgh, and London. Others adorn the ancestral halls of the British nobility. He painted eight portraits of George III. Among the notables who sat for him were Mrs. Siddons, the Duchess of Devonshire, the Duke of Argyll, George III, the Prince of Wales, afterward crowned George IV, Lord Cornwallis, Pitt, Blackstone, Clive, Burke, and our own Franklin. His *Duchess of Devonshire* brought $50,000. Some of his noted pictures other than portraits are *The Market Cart, The Brook, Rustic Children, Cows in the Meadow, The Harvest Wagon,* and *Gainsborough's Forest.* The "Gainsborough hat," a broad article of headwear worn by the beauties of the day, is as famous as the "Vandyke collar." A strong friendship existed between Gainsborough and Sir Joshua Reynolds. It was marred, however, by an estrangement lasting several years.

Galahad, Sir, in British legend, the purest and noblest of King Arthur's knights, the only one to whom a vision of the Holy Grail was granted. The character of Sir Galahad is believed to have been added to the Arthurian legends by Walter de Map, a Welsh poet at the court of Henry II in the latter part of the twelfth century. According to his account Galahad was the son of Sir Lancelot and Elaine; in other legends he is represented as created by enchantment. In all the various tales based upon King Arthur and his round table Galahad is ever a type of ideal knighthood. He appears in Tennyson's *Idylls of the King.* Tennyson has also a well known poem entitled *Sir Galahad.* See IDYLLS OF THE KING; ARTHUR, KING; HOLY GRAIL.

> My good blade carves the casques of men
> My tough lance thrusteth sure,
> My strength is as the strength of ten,
> Because my heart is pure.

Galapagos, gă-lăp′ā-gōs, a group of volcanic islands in the Pacific Ocean. The name is Spanish, meaning tortoises. The group is situated on the equator, 600 miles from the mainland of Ecuador, to which country the islands belong. The greatest altitude is about 4,000 feet. Area, 2,400 square miles. Population, 400. There are over 2,000 extinct craters in the group. The summits of the islands are clothed with ferns and coarse grasses, nourished by moisture from low-hanging clouds. The coasts are arid, and almost rainless. The bed of the ocean between the group and the mainland is so deep that there appears to have been little communication. It is a little world by itself. Quite a number of plants and animals, Mr. Darwin says the greater number, are not found elsewhere. He collected twenty-five species of land birds that have not been found in

any other country. The tortoise of these islands is noted. It reaches a weight commonly of 200 pounds, sometimes twice that. Its flesh is much esteemed for food. It is strong enough to carry a man on its back with ease. The springs are situated in the rainy or elevated portions of the island. Broad paths, well beaten by tortoises, lead from them toward the coast in every direction. There are no palm trees here, something unsual for a tropical region. The climate is cooler than that of any other equatorial land at sea level.

Galatea, in Greek mythology, a sea nymph, daughter of Nereus and Doris. She was wooed by the Cyclops, Polyphemus, who received scorn and ridicule in return. Galatea's affection was won, however, by Acis, a handsome shepherd whom Polyphemus slew in a fit of jealous rage. He would have slain Galatea also, had she not escaped into the sea. Galatea is often called the queen of the sea. A celebrated fresco by Raphael in the Villa Farnesina represents Galatea drawn over the sea by dolphins accompanied by sea nymphs and sea gods. In the air above are cupids shooting arrows at Galatea's attendants. This work of art is called the *Triumph of Galatea.* Handel has written an opera entitled *Acis and Galatea.* For an account of another Galatea, see PYGMALION.

Galatia, in ancient times, a country of Asia Minor, lying south of Paphlagonia, west of Pontus and northeast of Phrygia; but in about 241 B. C. the Gauls invaded and conquered this country and settled there, whence the name. The Gauls did not settle in the cities, where but little change occurred; but they served as mercenaries in the armies of the Greek kings of the East, and compelled neighboring countries to pay them tribute. The majority of them retained their old Celtic language up to the fourth century.

Galaxy. See MILKY WAY.

Galen (130-201), a celebrated physician of Grecian birth and Roman practice. Having exhausted the educational resources of Greece, he gained a wide reputation as a healer of disease. He went to Rome, as many educated Greeks of that period did. He attended the Emperor Marcus Aurelius in his northern wars with the barbarians, and expressed gratification on account of the opportunity for dissection offered by barbarian warriors slain in battle. Galen wrote a large number of works of which eighty-three are extant, covering the field of medicine surprisingly well. Galen's treatises were translated from the original Greek into Arabic and Latin and English, and later into other modern languages. They are the channel through which Greek medicine has been made known. Galen's authority remained supreme until about the time when our Atlantic coast was occupied by colonies. As late as the middle of the sixteenth century a London physician, who had assailed the teachings of Galen, was obliged to take back what he had said and to hand in a written apology on penalty of expulsion from the College of Physicians. Later Galen's teachings were stoutly opposed on account of excessive blood letting or cupping, and the use of herbs too exclusively as remedies. Oliver Wendell Holmes, lecturing before the medical students of Harvard, spoke of "remedies which are both Galenic and chemical," that is, both vegetable and mineral, and again, "These Galenists were what we should call herb-doctors today." The housewife, with an old-fashioned store of boneset, sage, sassafras, pennyroyal, and spikenard, is a Galenist without knowing it. See MEDICINE; AVERROES.

Galena, lead ore. Chemically, it is lead sulphide. It occurs in cubic crystals and in masses. It has a brilliant metallic luster, and bluish gray in color. Galenas are quite likely to contain a percentage of silver. It is found in Saxony, Bohemia, Spain; in England, Cornwall, Derbyshire and Cumberland; in New South Wales, and Mexico. In the United States it is found in Illinois, Missouri, Wisconsin and Iowa, and in the western states, where it is also worked for silver.

Galesburg, Ill., the county seat of Knox County, is 43 miles northeast of Burlington, Iowa. The Atchison, Topeka & Santa Fe, the Chicago & Northwestern and the Chicago, Burlington & Quincy railroads enter. This city, settled in 1837, by pioneers

from New York was the rendezvous and rallying point for "free-soilers" during the Kansas-Nebraska struggle over the negro slavery issue. Here, on the grounds of Knox College, took place the famous Lincoln-Douglas debate in 1858. Shops of the Burlington railroad are located here, and manufactures of the city include boilers, engines, bricks, wagons and agricultural implements. Educational institutions besides Knox College are Lombard College, St. Mary's School and St. Joseph's Academy. Population, in 1920, 23,785.

Galilee, the northernmost division of Palestine. It lay on the east shore of the Lake of Gennesaret, or Sea of Galilee. It joined Samaria on the south. It now belongs to Turkey. The Sea of Galilee is about thirteen miles long and something less than seven miles in breadth. It is really a widening of the River Jordan on its way to the Dead Sea. Its surface is higher than that of the Dead Sea, but is still 680 feet below that of the Mediterranean. Its waters are wholesome and abound in fish. Its shores were thickly peopled in the time of Christ. Nine cities and towns, now in ruins, stood on its coast. Numerous large villages dotted the neighboring plains. "Like Jerusalem, the Sea of Gennesaret is enshrined in the heart from childhood. The home of Christ—'His own city'—Capernaum, lay on its shores; many of His miracles were performed around and upon it; He taught the multitudes that followed Him on the heights over it, along its pebbly beach, and from a boat on its surface; most of the apostles were fishermen, who here gained their daily bread; and one of Christ's last earthly interviews with them, after the crucifixion, was on that occasion when, driven probably by necessity, they had temporarily resumed their old occupation, and had toiled a long night without success." See PALESTINE; JORDAN; DEAD SEA.

Galileo, găl-ĭ-lee′o (1564-1642), an Italian astronomer. A native of Florence. His father was a musician of slender means. He was proud of his boy and contrived with painful sacrifices to give him a good education, sending him to the university at Pisa to study medicine. Galileo, however, took to mathematics and scientific investigations. There is a tradition that, watching a great bronze lamp in the Cathedral at Pisa while a student, he noticed, by counting his pulse, that the lamp took no more time to swing far out to one side than when the swing was scarcely noticeable. Following the matter up, he discovered the laws of the pendulum; that a short pendulum swings oftener than a long one; that a heavy pendulum and a light pendulum of the same length swing in the same time; and that whether a pendulum swings far or slightly, all the swings of the same pendulum are made in the same length of time. At all events he is credited with the enunciation of the laws. His growing reputation secured him a position as professor of mathematics at Pisa. Bitter opposition from the other professors, however, which indeed began before he was admitted to the faculty, finally drove Galileo from Pisa and from Florence. He was at last made professor of mathematics at Padua under the protection of Venice.

Galileo was one of the most inventive men the world has ever seen. He invented or improved the barometer, the thermometer, the pendulum, hydraulic machines, military machines, the compass, the telescope, the microscope, and a large number of other contrivances of less note. His house at Padua was a perfect machine shop, Galileo the master mechanic. His greatest invention, however, was the telescope. He had heard in the year 1608 of an instrument in Flanders that enabled the people to see far off. This hint set him at work. He made his first telescope out of an old organ pipe and a pair of lenses. In 1609 he carried a finished telescope to Venice, and from the top of a tall bell tower the senators and nobles looked out upon the Adriatic. Ships that had sailed out of sight were brought back apparently near the shore; far off islands were as clearly seen as though they were at the spectator's feet. The Venetians saw at once that the telescope would change the management of armies and lessen the dangers of sailing. They were practical men and realized the value of a field glass. To understand their pleasure and astonishment,

we must remember that this was the first field glass or telescope ever used. The Venetians sent Galileo back to Padua loaded with honors and fixed his salary at a princely sum. Princes and nobles made requests for telescopes. Galileo manufactured over a hundred of these instruments and presented one each to the sovereigns of France, Austria, and Spain.

He accepted an invitation to return to Florence, his native town, where he hoped to lead a life of pleasure and investigation. In the meantime the bitterest opposition had sprung up. Education in the Roman Church was in the hands of a particular sect or society, the Jesuits. They were the learned men of Europe, and were exceedingly jealous—naturally so—of scientific progress not originating with themselves. Unfortunately for Galileo, the Jesuits had long taught that the earth is the center of the universe and that the heavens revolve around it. They taught that the stars were in all probability spiritual lights. They held that the Scriptures taught these doctrines, and that the church alone had the right to say what the Scriptures taught.

One of Galileo's first discoveries, as he turned his telescope toward the heavens, was that the moon, whose silvery face had beamed unchanged for generations, was really a wild waste of mountains and deep ravines. His telescope resolved the milky way into a host of stars. Galileo announced that he had added millions of stars to the heavens. Looking at Jupiter he saw that it was attended by small stars. He saw the rings of Saturn. In a book, *A Message from the Skies,* he published his discoveries, and took the position that the earth turns on its axis and revolves about the sun. This was the theory of Copernicus, which had been outlawed by the Jesuits. Intense excitement followed. The progressive people of the day hailed Galileo as a great astronomer and rejected the teaching of the Jesuits, practically forming themselves into a new sect, or at the least, what constituted a large element of unbelief in the church. It was hard enough for the Jesuits to tolerate a rising scientist whose views disagreed with their own and whose reputation for learning surpassed their own. When it came to the creation of a large body of followers who rejected the interpretation of the Scriptures given by the church, the matter became exceedingly serious.

Luther and other reformers had made trouble enough. Galileo was summoned to appear before the grand inquisition in Rome, and was advised, on pain of imprisonment, to assert that he did not believe in the Copernican doctrine; that he did not teach it; and that he would abide by the teachings of the church. He promised. The interesting part of Galileo's life was over. He went to Rome, a learned, distinguished man, high in the favor of princes and men of high position. He returned to Florence humiliated, discredited, disgraced, under suspicion. His admirers were mortified to think he had recanted his views, and the people of the church hated him for his heresy. Nevertheless, he was permitted to settle down at home in peace. He might have continued his scientific investigations unmolested if he had been prudent. He smarted under the treatment he had received, however, and, though under promise not to teach or defend his astronomical theories, he was rash enough to publish his *Dialogue,* in which three persons discuss astronomical theories. A young scientist announces his views with enthusiasm, but, by the authority and argument of his elders, he is forced finally to withdraw his views in deference to their superior knowledge and sanctity. The inquisition summoned Galileo to Rome again and made him apologize on his knees. But the story is too long to be told here. Galileo was kept in nominal confinement for a number of years, but was allowed finally to return home. Blindness came over him. He ended his days peacefully at Florence and was buried in the church of Santa Croce.

Galileo was a fine musician, having been trained by his father to play on the organ and the lute. He was a careful student of poetry and excelled in painting. He was an able writer. It is a matter of regret that so able a man might not have been permitted to investigate and invent in peace; but his treatment was only what a teacher of new doctrines must have ex-

1. Galls on elm leaf caused by plant-lice. 2. Purse-gall on elm leaf caused by plant-lice. 3. Twisted gall on poplar leaf. 4. Rose-gall caused by gall fly. 5. Galls on rose leaf. 6. Gall on willow leaf. 6b. Cross-section, larva within. 7. Oak gall on the stem. 8. Oak galls on the bark. 9. Woolly galls on oak leaf. 10. Coin galls on oak leaf. 11-12. Oak leaf galls. 13. Capsule galls on basswood. 14. Cross-section of same, maggot within. 15. Gall on juniper. 16. Bud gall, oak bud. 17-19. Nut galls, oak. 20. Clustered galls, on thyme.

GALLS.

pected in that day when all religious teaching was intolerant.

See ASTRONOMY; COPERNICUS; TELESCOPE; PTOLEMY.

Gall, an unnatural vegetable scale, swelling, or tubercle. Galls occur on the leaves, stems, twigs, bark, and roots of many plants. They are caused by the sting of various gnats, gall-flies, gall-wasps, and moths. Each species of gall-producing insect frequents some particular species of plants, and lays its eggs in the same kind of a place. One insect produces galls on a pine; another species visits the stalk of a goldenrod. The galls of ten different insects are found on willows. The gall is, of course, a diseased condition of the plant. It is caused either by the injection of poison by the parent insect, by the presence of the egg deposited by an insect, or else by the irritation of the larva as it hatches and eats. Some galls are inhabited by a single larva; others are infested by a colony. A careful examination of most rose-bushes shows that the tender parts are covered with minute tubercles, each of which contains an egg or larva. An examination of the flower and vegetable garden, meadows, and woods will reveal a great number of plants selected by insects to serve as hosts for their young.

Galls differ greatly in their interior structure, being resinous, corky, cobwebby, or leathery in texture. The galls of commerce, known also as gall-nuts and nut-galls, are produced on various oaks of the Mediterranean region. They are spherical, varying from a pea to a nutmeg in size, and are of different colors, as black, blue, and green. They contain a large amount of concentrated tannic acid and gallic acid, the latter in the form of minute white crystals. They are used extensively for tanning the finest kinds of leather, and in dyeing expensive goods. Gallic acid is used also in medicine. Oak galls make black ink of the best quality. Chinese galls are produced on a kind of sumach. Various other galls are known to the druggist. Many galls found in the United States are of excellent quality, but the expense of gathering them is too great to permit of their collection for commercial purposes.

Gall Bladder. See LIVER.

Gallas, a native race of eastern Africa. The Gallas are related to the Somalis. They are dark people, but they are not Negroes. They inhabit southern Abyssinia and the regions southward to the equator.

Gallatin, Albert (1761-1849), a distinguished American public financier, was born in Geneva, Switzerland, coming to the United States in 1780. In 1783 he purchased land on the western frontier of Pennsylvania, and in the following year opened a country store in Fayette County, Pa. In 1789 he was a delegate to the state constitutional convention, and from 1790-93 he was a member of the Legislature. From 1795 to 1801 he was a member of the Pennsylvania assembly, where he gradually rose to be its acknowledged leader. In 1801 Gallatin became Secretary of the Treasury, which position he held until 1813, rendering most valuable service. From 1816 to 1823 he was Minister to France, and three years later he went to London as United States Minister, remaining one year. He was nominated for the vice-presidency in 1824, but withdrew in favor of Clay. In 1843 he declined to enter Tyler's cabinet as Secretary of the Treasury, and removed to New York.

Galleon, a large, unwieldy sailing ship. It was formerly much used by the Spaniards. The galleon was an awkward ship of three or four decks, all capable of carrying guns and marines armed with dirk and cutlass. "The galleons," says Motley, "were huge, round-stemmed, clumsy vessels, with bulwarks three or four feet thick, and built up at stem and stern, like castles." The Spaniards employed the galleons especially as treasure-ships in their western commerce. A Spanish galleon laden with treasure of the New World was a prize worthy of Drake or Hawkins. See DRAKE, SIR FRANCIS.

Galley, a ship used chiefly by the ancient Greeks, Romans, and Phoenicians. Galleys were in use along the Mediterranean, however, as late as the closing years of the seventeenth century. The boats were long and narrow, perhaps 150 feet long and 20 feet across at the widest part. They carried small sails, but depended for motion chiefly upon the rowers. There were

sometimes several tiers of great oars on each side, and to a bench beside each oar were chained, more likely than not, four or five slaves or convicts. The treatment which these wretched creatures received at the hands of the galley masters is dreadful to think of. Slaves were chained together so close that they could not sleep at full length; their allowance of food, which consisted chiefly of dry sea-biscuit with now and then a bit of something else, was barely sufficient to keep them in working trim. On a narrow bridge which ran the length of the boat above the rowers stood two officers with long whips with which they lashed a slave who showed symptoms of laziness. Sometimes men were sentenced to the galleys for life. In the story of *Ben Hur,* Lew Wallace has given a vivid account of the Hebrew lad's service as a galley slave and his final escape. Jean Valjean, Victor Hugo's great character in *Les Miserables,* had a somewhat similar experience. Galleys had small decks at either end; in the war vessels, cannon were mounted on these decks, and the boats were manned with as many as 1,200 men.

Galli-Curci, Amelita (1889-), an operatic soprano who since her debut at Rome in 1909 has thrilled great audiences on two continents. She was born at Milan, Italy, and is of Italian and Spanish extraction. She studied piano, composition and harmony, and at the age of 19 was appointed professor of these studies at the Royal Conservatory, in Milan. As a vocalist, Madame Galli-Curci is self taught. Her first role was Gilda in *Rigoletto,* and she made her debut in the same role at the Auditorium, Chicago, in 1916. Before appearing in the United States, Madame Galli-Curci had toured Italy, Spain and South America. In 1921-22 she sang for the first time the title role in *Madame Butterfly.* Her repertoire includes also Dinorah; Juliet, in *Romeo and Juliet;* Lucia, in *Luca di Lammermoor;* Mimi, in *La Boheme;* Elvira, in *I Puritani;* and Leila, in the *Pearl Fishers.*

Gallinule, an aquatic bird belonging to the rail family and closely allied to the coots. The common North American names of this bird is "mud hen" and "water hen." It is found in the British Isles and is widely distributed on the European continent. The common gallinule is a rather handsome bird about eighteen inches long, having olive green upper parts, and purplish blue underparts and head. This bird is often shot for sport, but its flesh is not palatable. Like the coot, it can swim and dive well. It nests, usually on the ground, near the water it frequents; its food consists of insects, worms, mollusca and the seeds of various grasses.

Gallipoli, a peninsula and town in European Turkey, the scene of many battles in connection with various contests for control of the Dardanelles. The peninsula, averaging four miles in width and having a length of fifty-five miles, extends southwestward, separating the Dardanelles, on the east, from the Gulf of Saros, on the west. In 1357 it served the Turk as a stepping stone into Europe; it figured in the Crimean War; and in 1915-16 it was the scene of a sanguine but unsuccessful allied struggle for control of the Dardanelles.

The town is a Turkish naval base; during the Middle Ages it was important commercially, but is of little more than local commercial importance at the present time. At present it has a population of about 20,000, but is said to have once been the home of 100,000 people.

Gallon, an English measure of capacity for both dry and liquid substances. It contains four quarts. The standard gallon of the United States, the same as the wine gallon, contains 231 cubic inches, and is almost equivalent to a cylinder seven inches in diameter and six inches high. A gallon of water weighed under ordinary conditions at a temperature of 62° F. weighs 8.3389 pounds.

Galsworthy, John (1867-), a prominent English novelist and dramatist, noted for his keen insight into social problems. His works deal with some injustice or evil which he protests. Both his novels and plays possess high literary merit; for in his efforts to secure reform, he has never sacrificed artistic workmanship. His plays, most of which have been produced, include: *Justice, Joy, Strife, The Silver Box, The Pigeon, The Eldest Son,* and

The Foundation. His best known novels are *The Island Pharisees, The Man of Property, The Country House, The Patrician, The Forsyte Saga, The Dark Flower, Villa Rubein, Awakening, Beyond, The Freelands* and *Fraternity.*

Galt, John (1770-1839), a Scottish novelist. He was born at Irvine, Ayrshire. He attempted a mercantile life, but failed. He then tried the law without success. After a tour of southern Europe, during which he formed the acquaintance of Byron, he returned to England and published several books of travel, a life of Cardinal Wolsey, and several tragedies which were severely criticized. In 1820 and 1821 *The Ayrshire Legatees* appeared in *Blackwood's Magazine,* and proved a great success. *Annals of the Parish, The Provost, The Steamboat,* and *Sir Andrew Wyllie* followed and were warmly received.

Galt was a voluminous and unequal writer; but while several of his productions are already forgotten, others of them will perish only with the language. In depicting provincialism, in representing life as it flows on in small towns and villages—communities in which the successful shopkeeper may aspire to be the chief magistrate, and in which the minister is the most important personage—he is without a rival. He has founded a school of writers in Scotland, but as yet his followers have produced no work equal to *The Provost* or *The Annals of the Parish.*—Chambers.

Galt, Ontario, Canada, an industrial city twenty-five miles northwest of Hamilton, on the Grand River fifty-five miles from Lake Erie. The city is served by the Lake Erie & Northern, the Grand Trunk and the Canadian Pacific railroads, and has interurban connection with numerous neighboring towns. The country surrounding Galt is rich in agricultural land and in timber, limestone and sand. The products of the numerous industrial plants include silk and woolen goods, boots and shoes, boxes, boilers, brassware, pumps, machine tools, safes, hats, stoves, nails, oils, edge tools and agricultural implements. Galt contains six parks, Victoria Park being the largest and most pleasant. The public schools are modern and are supplemented by a fine library. There is a Y. M. C. A., a collegiate institute and an armory. Population, 1921, 13,216.

Galvani, gäl-vä'nee, **Luigi** (1737-1798), an eminent Italian scientist. He occupied a chair of physiology at the University of Bologna. From the twitchings of a frog's hind legs when placed in an electric circuit, he was led to investigate the subject of animal electricity. His researches were extended by Volta. In the frequent revolutions that swept over northern Italy, he was subject to annoyances that drove him from his position. In his honor the name of galvanism has been given to that branch of the science which treats of currents arising from chemical action, as from the combination of minerals and acids, *i. e.,* to current electricity generated by batteries.

Galvanized Iron, sheet iron coated with zinc. The ordinary commercial article is prepared in the following manner. A sheet of iron is first cleansed with hot sulphuric acid to remove rust and other impurities, and is washed in cold water. It is then plunged into a bath of molten zinc covered with a film of sal ammoniac to prevent its surface from turning into dross. Upon taking out the sheet of iron, it is found to be covered with a coating of zinc, deposited in crystal-like powder, such as may be seen on a frosted window. A more expensive article is prepared by a coating of tin, followed by one of zinc. The plates are treated with sulphuric acid and washed as before. They are then piled in a tank with layers of finely granulated zinc between the plates. The bath is then filled up with a dilute solution of muriate of tin, consisting of about two quarts of the muriate to 300 gallons of water. A sort of galvanic action is set up. At the end of two hours the plates are found to be coated slightly with tin. They are then treated to a zinc bath as before. Galvanized iron is proof against all ordinary attacks of weather. It requires no paint. It is much used for outside walls and roofs, for water pails, and other purposes, eaves, troughs, cistern pipes, smoke-stacks, furnace jackets, and the like. Bolts used in shipbuilding are galvanized as a protection against rust.

Galvanometer, an instrument used to indicate the presence, the direction, or the strength of an electric current. If a wire

or other conductor through which a current of electricity is passing be brought near a freely suspended magnetic needle, the latter betrays a tendency to swing around and place itself in a position at right angles to the path of the passing current. The amount of the deflection of the needle from a north and south direction is proportioned to the strength of the current. If the wire through which the current is passing be coiled back and forth, the deflection is proportionate to the number of the turns of the wire. By giving the wire many turns it is possible to discover the presence, as well as the direction, of a very small current. Such an instrument is called a galvanoscope. If the needle be provided with a dial, and the dial be marked with figures to indicate the number of degrees of deflection, the instrument is called a galvanometer. There are several models, known as the tangent, the astatic, and the d'Arsonval. The facts on which the galvanometer rests were discovered by a physicist named Oersted.

Galveston, the chief commercial city of Texas. It is situated on Galveston Island, a low body of land thirty miles long and from one to three miles wide, composed of sand and shells thrown up by the waves of the Gulf. A passage of water between the island and the mainland is known also as Galveston Bay. The city is advantageously situated with reference to the Gulf trade with Central America, the West Indies, and Europe. It is also a natural center of distribution and shipment for a large extent of territory, embracing Texas and the country for an indefinite distance northward. The island was at one time the haunt of pirates; the notorious Lafitte had his headquarters here.

Galveston was incorporated in 1839. It was reached for the first time by rail in 1860. It is now the terminus of several important lines. The general government has expended no less than $9,000,000 in deepening the channel which leads from the city out to the sea. This has been done by means of a jetty system. The channel has been narrowed by confining banks from five to seven miles in length. They are constructed of long lines of loose sandstone faced with hugh granite blocks, weighing from five to twelve tons apiece. These moles are twelve feet wide at the top. The tide is confined thus to a narrow channel. It races in and out between these artificial banks, and has scoured out a channel to a depth of twenty-six feet. Although the depth was but nine feet before the construction of the jetty system, it is expected that the final depth will be not less than thirty feet, affording an adequate channel for seagoing vessels of large tonnage.

Being situated on the Gulf, the city is subject to tropical storms from the direction of the West Indies. The worst on record is that of September 8, 1900, when a wave of water fifteen feet high engulfed the city and island destroying 6,000 lives and causing a property loss of not less than $17,000,000. To avoid the recurrence of such a catastrophe, a sea wall, four and one-half miles in length, has been built along the exposed front of the city. It is sixteen feet wide at the base, five feet wide at the top, and is sixteen feet high. It is protected by twenty-seven feet of riprap or loose rock on the Gulf side. This work has cost the city about a million and a half. It has been decided also to raise the grade of the city. Bonds to the extent of $2,000,000 have been issued for the purpose of bringing in earth. It is proposed to make that portion of the island seventeen feet higher at the gulf frontage and eight feet higher at the rear, with a regular grade between. The amount of labor and material required for such a fill is something enormous; but the city is determined to be out of danger. These improvements were made or determined upon by a city having less than 40,000 population at the time, a record unequaled.

Galveston is the first of all cotton ports. The shipment was 3,217,000 bales in 1913. During 1917 exports fell to 791,000 bales, owing to war conditions.

Cottonseed oil, oil cake, grain, copper and iron ore, cattle, and lumber are important exports. Breezy summers, mild winters, hard, sandy beaches, and excellent hotels are among the attractions held out to tourists. The average temperature for the year is from 68° to 70°. That for July is about 83°; that for

January 50° lower. The annual rainfall is about 46 inches. Population in 1920, 44,255. See TEXAS; BANANA.

Gama, gä′mä, **Vasco da** (1460-1524), a Portuguese navigator. He was of noble descent and early acquired a reputation as a brave and able sea commander. When the king of Portugal decided to send an expedition in search of a passage south of Africa to India, Vasco da Gama was selected to command. After confessing and receiving absolution after the manner of those going to their death, Vasco and his companions set out with four ships July 8, 1497. In spite of storms and tempests, May 20th of the following year they reached Calicut, India, and set up a marble pillar in evidence of their discovery and occupancy of the country. In September, 1499, they anchored at home, bringing the king a glowing account of the prospects of trade with India. A fleet of thirteen ships was sent out at once to establish a factory for trade with the Hindus. Leaving a colony behind, the ships returned in due time, heavily laden with rich shawls, silks, spices, precious gems, and other wares of the Indies, bringing great gain into the king's coffers.

Acting at the instigation of Moorish merchants who did not want to see the Portuguese in that country, the Hindus put to death these first settlers. Vasco had not been treated very well himself by the Hindu king of Calicut. "I feel in my heart a great desire and inclination to go and make great havoc of him," said he. In 1502 he was sent accordingly with a fleet to the coast of India. He bombarded Calicut and, after the manner of the time, treated the inhabitants with a degree of cruelty that has left an unfavorable impression of his character. He was made Portuguese viceroy of India, with the lofty title of Lord of the Conquest of Ethiopia, Arabia, Persia, and India. He was instrumental in making Portugal for a time the leading commercial nation of Europe. He favored the establishment of the Franciscan monasteries in Farther India. He died there, and was buried in one of their establishments, but his remains were subsequently brought home and interred with due pomp and ceremony.

Gamaliel I, a Jewish doctor of law and member of the Sandhedrin, referred to in the New Testament, in the Book of Acts. He was a humane man and liberal in his views, and counselled his colleagues to exercise caution and moderate measures in the treatment of the apostles, for he held that if the work of the Apostles was simply that of man, it would come to nothing, but if it was the work of God, it would avail them nothing to overthrow it.

Gamaliel II grandson of Gamaliel I, tried to bring about a unification of the Jews in Palestine after the struggle with Rome. He was successor to Johanan Ben Zakkai, as leader of the learned council of Jabneh, which had replaced the old Sanhedrin at Jerusalem.

Gambetta, Leon N. (1838 - 1882), a French statesman. He was born in Cahors. His parentage was Jewish. He was a lawyer by profession. In 1870, when Louis Napoleon surrendered at the battle of Sedan, Gambetta represented Marseilles in the French Assembly. He was made minister of war in the provisional government that was set up. When the German troops encircled Paris he escaped in a balloon and established his headquarters at Tours. He was for a time the practical dictator of the French government. He did his best to withstand the Germans, but French affairs had been mismanaged too long. Gambetta was obliged to give up. During his remaining years he was several times a member of the French ministry. He died at Sevres from the accidental discharge of a pistol.

Game, animals of the chase. In its widest sense the term includes all fishes, birds, and animals, both of the land and sea, pursued and taken for profit or pleasure. By a fiction of English law defended by no less an authority than Blackstone, all game belongs to the king or to those whom he may authorize to take it. Under this view the game laws of England were very severe. It was a common saying that a slayer of the king's deer was treated more harshly than the slayer of men. As a matter of fact, hunters were put to death for killing deer without permission. The illegal taking of of rabbits, pheasants, and other game

is known in England as poaching. It is still treated as a serious offense. In America more liberal views have prevailed. Game of all sorts has been considered the rightful property of anyone who chose to take it, provided he kept out of inclosed or occupied premises. A farmer is considered entitled in season to the game found on his own farm, but the owner of wild, uninclosed, uncultivated land hardly ventures to set up a claim to exclusive ownership.

To prevent the extermination of game most states have enacted laws forbidding hunting or fishing during certain seasons. The open season during which each species of deer, moose, waterfowl, grouse, and game fish may be taken is established by statute. Many states forbid the exportation of game. Game wardens are appointed to enforce the laws. A number of sportsmen's organizations, the American Ornithological Union, the Audubon societies, and other associations, local, state, and national, aim to stimulate officials to vigilance. The national government has enacted game laws for Alaska and has established numerous game and forest preserves, notably Yellowstone Park.

CANADA. An agreement was effected between the United States and Great Britain in 1916 for the protection of insectivorous and game birds migrating between Canada and the United States, the main provision being that no insect-destroying bird—no bird important to agriculture—shall be killed at any time; other provisions regulate the taking of game birds. Execution of the terms of the treaty is insured by an Act of the Canadian Parliament of 1917, so far as the treaty relates to Canada. The Canadian Parliament has enacted general laws regulating the export of game birds and animals.

See DEER; GROUSE; DUCK; SALMON; TROUT; BIRD.

Games, as commonly used, sports or amusements which are governed by fixed rules and which progress to some prescribed climax or culmination. Games were known and practiced among the earliest nations. Among the Greeks and Romans public exhibitions occurred of trials of strength, skill, and endurance. These were frequently accompanied with religious ceremonies. The Olympic, Pythian, Nemean, and Isthmian games were national institutions of Greece and formed the strongest bond between the independent Greek states. During the age of chivalry, jousts and tournaments were the popular forms of sport. These ancient and medieval games were contests; but many games exist, notably children's games and certain forms of dancing, which are in no sense competitive.

For convenience, games may be somewhat loosely classified as:

I. Active games.

II. Quiet games.

Among active games belong:

1. Singing and dancing games. The simplest of these are the "motion songs" of the kindergarten. Singing and dancing are the natural, spontaneous expression of feeling. When this expression is regulated to some prescribed and complete action, a game is the result. Many games of this class originated in religious rites. "London bridge is falling down" is believed to be a relic of the ancient ceremony of offering a human sacrifice at the building of a bridge. "Oats, peas, beans, and barley grows" is probably from some ceremony employed to propitiate the gods who preside over the fertility of the soil. "The farmer and the child," "I've come to see Miss Jenny-a-Jones," "King William was King James's son," are other simple games of this class. Singing and dancing games popular often with older children are, "Going to Jerusalem," "Jolly is the Miller," "Dan Tucker," "The Needle's Eye," "Drop the Handkerchief," "Virginia Reel," "Money Musk," and country dances and contra dances. These involve sometimes both singing and dancing, sometimes dancing without singing. They are called in some instances games, in others, dances; but they belong properly in the same category.

2. Out-door, non-competitive games combine amusement with healthful exercise. Such games are "I Spy," "Tag," in all its forms, "Beckon," "Prisoner's Base," "Plunder," and "Pom, pom, pull away."

3. Active competitive games must be classified as:

a. Athletic contests.

b. Individual competitive games, such as croquet, tennis, golf, hare and hounds.

c. Team games, including baseball, football, cricket, hockey, and basket-ball.

Under the head of quiet games, the number is legion. Among those which are non-competitive may be mentioned such old-fashioned games as "Hide the thimble," "Button, button, who's got the button," and games of forfeit. Among competitive games are games of skill and games of chance, and those involving both skill and chance. To this class belong rhyming games, guessing games, and games involving some play upon words, or trick of expression or motion. Backgammon, chess, checkers, dominoes, jackstraws, logomachy, flinch, and all games of cards belong under the head of quiet games.

The games which rank highest, both in the extent of interest they arouse and in the development of character they promote, are team games. The subordination of the individual to the interests of the team inculcates one of the most important lessons of life.

See HANDBALL; BASKETBALL; BASEBALL; GOLF; CRICKET; POLO; HOCKEY.

Gananoque, Ontario, Canada, is a popular summer resort situated at the junction of the Gananoque and the St. Lawrence rivers. It is served by several lines of steamers, by the Thousand Island Railway, which connects with the Grand Trunk, and has ferry connection with Clayton, New York. Though primarily a summer resort, with a stable population in 1921 of only 3,694, Gananoque has a number of industrial plants. The principal products of these are milk powder, cheese, boats, automobile bumpers and springs, lubricating and motor oils, rivets, shovels, hardware and gasoline engines. There are three primary schools, a high school and a public library.

Ganges, găn′jēz, the chief river of India. It is one of the great rivers of the world. It drains the southern slope of the Himalayas. Its headwaters issue from the ice caves of mighty glaciers from 10,000 to 14,000 feet above the sea level. Eleven hundred miles from the sea it is a stream from one to two miles in width and perhaps thirty feet in depth. Here the current moves smoothly with a descent of but six inches to the mile, which nearer the sea becomes less than two inches. The lower part of the valley which lies in the province of Bengal is subject to inundations. In July the river is swollen by the melting snows of the mountains until it acquires a depth of sixty feet and spreads out over a district 100 miles in width. At this season of the year changes are likely to be made in the main channel. The river cuts across tongues of land, carrying away villages, leaving towns formerly on its banks miles inland. It is considered unsafe to erect buildings of importance near its banks. The river has a total length of 1,557 miles. It drains 390,000 square miles of territory.

As it nears the sea the Ganges divides into numerous mouths connecting with those of the Brahmaputra. These rivers have created the greatest delta known. It extends along the coast for a distance of 300 miles, and has been built out into the Bay of Bengal for a distance of 200 miles. A considerable portion of this delta is so swampy that it is covered with jungles inhabited only by the tiger, the crocodile, and other beasts of prey.

The Ganges is a river of great cities. Nearest its mouth is Calcutta. Farther up on the main river or its branches are Benares, Allahábád, Cawnpore, Lucknow, and Delhi. It is said to be the most frequented waterway in the world. Notwithstanding the flood of water carried by the Ganges to the sea, vast regions in its basin suffer for want of water, especially at rainless seasons of the year. In 1842 the British government undertook the construction of a vast system of irrigation. By 1855 9,900 miles of canals and supply ditches had been constructed. It was necessary to carry the main canal across four streams in themselves torrents. The water is carried over one of these rivers by a stone aqueduct 164 feet wide. There are 15 arches with a span of 50 feet each. On land the canal is 200 feet wide and the current runs 10 feet deep. The system cost $30,000,000. It produces $27,000,000 worth of crops yearly. About 1,250,000 acres are irrigated. The government charges the half naked rice raisers about one dollar and a half an acre for water privileges.

The valley of the Ganges is one of great fertility, and supports an enormous population. The people live chiefly on rice, which they plant in the alluvial mud, in their irrigated fields, or after the river has receded into its normal channel. They live in miserable huts. The water buffalo, with its long, sweeping horns and capacity for working in the mud, is their domestic animal.

According to the belief of the Hindus, the Ganges issues from the feet of Brahma. Its waters are holy. The most sacred spot on its banks is the tongue of land at Allahábád where the Jumna and the Ganges join. Every true Brahmin desires to bathe in the river that his sins may be washed away. As the hour of death approaches he desires to be conveyed to its banks that he may be immersed and drink of its waters for the last time. For those who are unable to make the journey, water must be brought to their homes. After death he desires that his body be burned and his ashes cast upon the water.

Great temples with enormous flights of steps leading down to the water have been built at places held most sacred. Here devotees resort. The sick are brought hither by their relatives for hundreds of miles. The river channel is alive with thousands and thousands of people who are bathing and performing religious rites. Priests in attendance sell faggots of brushwood on which to burn the dead. Formerly the wives of a dead man were burned alive with his body, but this practice, as well as that of throwing infants into the river to appease the sacred crocodile, has been put a stop to by the British government.

See India; Calcutta.

Gangrene, the death or decay of the tissues in some part of a living body, resulting usually from the failure of the blood vessels to supply the part with blood. Before the modern knowledge of antiseptics a form known as hospital gangrene, which spread rapidly and usually resulted in death, often followed a wound received in battle, but this no longer occurs. There are two forms of the affection today, dry and moist gangrene. The former spreads very slowly and is usually due to the enfeebled condition of old age; the latter develops rapidly and may be caused by sudden stoppage of the arteries or the veins, pressure, extreme heat or cold, and various other agencies. One moist form, which spreads very rapidly, is due to infection by a germ. A part affected by gangrene becomes first red and painful, then soft, putrescent and discolored. Treatment is usually by means of amputation.

Gannet, a family of maritime birds. The gannet nests on inaccessible rocky islets, laying usually one egg. The common gannet, or solan goose, is about thirty-five inches long. It wanders as far south as Long Island. It nests on an island in the Bay of Fundy, on Bird Rocks in the center of the Gulf of St. Lawrence, and on Bonaventure Island. It is thus described by F. A. Lucas in the Report of the United States National Museum for 1891:

> The birds are usually associated in small, straggling flocks; and with outstretched necks, and eyes ever on the lookout for fish, they fly at a height of from seventy-five to a hundred feet above the water, or occasionally somewhat more. The height at which the gannet flies above the water is proportioned to the depth at which the fish are swimming beneath, and Captain Collins tells me that, when fish are swimming near the surface, the gannet flies very low and darts obliquely instead of vertically upon his prey. Should any finny game be seen within range, down goes the gannet headlong, the nearly closed wings being used to guide the living arrow in its downward flight. Just above the surface the wings are firmly closed and a small splash of spray shows where the winged fisher cleaves the water to transfix his prey. Disappearing for a few seconds, the bird reappears, rests for a moment on the water, long enough to swallow his catch, and then rises in pursuit of other game.

The eggs of the gannet have been gathered persistently. They are shipped by the barrel. The estimated number of gannets on Bird Rocks has been reduced from 150,000 in 1860 to 6,000 in 1900. A southern gannet is the chief producer of commercial guano. A gannet may be taken by fastening a fish to a piece of board, weighted to float a few inches under water. The plunge of the bird drives its pointed bill through the board. The flesh of the gannet is rank. The feathers are valuable.

See Booby; Cormorant; Pelican.

Ganymede, găn′ĭ-mēd, in Grecian mythology, a Trojan youth of exceeding

beauty. Even the gods envied him. Finally Zeus, in the disguise of an eagle, snatched the lad from the midst of his playfellows on Mount Ida and carried him off to Olympus. Here he was made cupbearer to the gods in place of Hebe. Ganymede is said to have been the most beautiful boy ever born. His story has been a favorite with painters and sculptors. Many works of ancient art are extant which represent the boy in the talons of the eagle, or sometimes with the eagle standing near him. See HEBE.

Garbage, kitchen and table refuse. The word is of unknown origin, meaning at first the entrails of fowls. The term has been extended to include all vegetable and animal refuse, such as bones, potato parings, scraps from the table, etc. Ashes are not properly garbage. The pigpen and the chickencoop take care of kitchen waste in farming communities, but in the larger towns the solution of the garbage problem is difficult. The housekeepers of New York City are required to place this refuse in cans. It is collected daily, loaded on scows, and sent off to an establishment where it is sorted and disposed of, the first step being to subject it to hot steam to kill all germs. The plant is calculated to care for 4,000,000 pounds of garbage daily. It has been found that American cities produce about one pound daily per inhabitant; European cities about half as much. Paris, such is the skill and economy of French housekeepers, has scarce any garbage.

Garcia, gár sē′ a, **Calixto** (1836-1898), a Cuban patriot and soldier, born at Holguin, province of Santiago. In 1868 he was one of the organizers of the revolution against Spain, known as the "Ten Years' War." The provisional government appointed him Commander-in-Chief of the Cuban army to suceed General Gomez. Between 1873 and 1895 he was twice captured and taken to Spain. In 1895 he escaped to Paris and came to the United States. In the Spanish-American War he commanded 4,000 Cubans at the battle of El Caney.

Garden, Mary (1877——). A Grand Opera star celebrated for her remarkable gift of impersonation as well as her voice. She was born in Edinborough, Scotland, but removed with her parents to Chicago when 11 years old. Here she remained until 19, when, through the aid of friends, she was enabled to go to Paris to continue her musical education. With the exception of this brief period of training, Miss Garden may be considered self-educated. Her opportunity in opera came unexpectedly. Because of her interest in Charpentier's new opera, *Louise,* she learned the title role. One night in 1900 the singer who had the role suddenly fell ill in the midst of the performance and Miss Garden was called upon to take her place. She sang the role for 100 nights. Later she sang in London, Brussels and other European cities. She sang first in opera in America in 1907. Miss Garden is especially adapted to those roles which call for impersonation and has made a world-wide reputation as *Melisande, Thais, Sappho, Louise* and *Salome.*

On January 14, 1921, Miss Garden was chosen general director of the Chicago Opera Company. She resigned in 1922.

Garden of the Gods. See COLORADO.

Gareth and Lynette. See IDYLLS OF THE KING.

Garfield, James Abram (1831-1881), the twentieth president of the United States. He was born near Cleveland, Ohio, November, 1831. His parents were New England people, originally of English, German, French Huguenot, and Welsh ancestry. They settled on a claim in the Western Reserve. The father died from the effects of fighting a forest fire. The mother was left a widow with a family of young children and no means of support beyond a log cabin, a small clearing, and eighty acres of debt-encumbered land. Though advised to bind her children out, Mrs. Garfield was determined to keep them together. She built fences, she plowed, she set out fruit trees, she spun, she wove, she mended, she read, she governed her boys, she paid off the mortgage, and brought her family up in intelligence and respectability. The heroic work of this mother, rewarded in the end by seeing her son president, is in itself a chapter of American history. She was the first moth-

er of a president to have her home in the White House.

James worked with his mother, attended district school, drove mules and worked on a canal boat, worked his way through an academy, taught school, saved money, and completed a course at Williams College. Though for a short time president of Hiram College, Garfield took an early interest in the formation, 1856, of the Republican party. He resigned his college presidency for a seat in the legislature of Ohio. He served with credit in the Civil War. He began as a lieutenant colonel, rose rapidly, and was made a major general for bravery in the battle of Chickamauga. In 1863 he took a seat in Congress, representing the famous Western Reserve, Cleveland, district of Ohio. His course in Congress was independent, sensible, and popular, covering the important period during which the seceded states were readmitted and our greenback money retired from circulation.

In 1880 James G. Blaine was a candidate for nomination to the presidency. His nomination and election would have meant the transfer of patronage to new party leaders. A strong movement was organized by Senators Conkling, Cameron, and Logan, to head off Blaine's nomination by bringing Ex-President Grant forward for a third term. Garfield was an anti-Grant leader in the Chicago convention, but was not himself a candidate. On the thirty-sixth ballot Blaine's supporters combined with the field against the Grant forces, and nominated Garfield. He was elected by a safe majority. In forming his cabinet he included James G. Blaine as secretary of state, and men representative of the various Republican factions. He tried to harmonize his party, but fell into a bitter fight with Senator Conkling over the appointment of a collector of customs for the port of New York. Garfield's nomination was finally confirmed by the Senate, but not before Senator Conkling and his colleague had resigned. July 2, 1881, President Garfield was about to take a train to join his family for a short vacation, when he was shot in the Baltimore and Potomac station at Washington by a disappointed office seeker, of whom it is hard to say whether he was a fool or fanatic. Garfield lingered some weeks in agony. He died near Long Branch September 19, 1881. He was laid at rest in a cemetery of Cleveland. His tomb commands a magnificent view of Lake Erie.

See PRESIDENTS.

Garfish, or **Garpike,** an American fish reminding one somewhat of a sturgeon. Both jaws are prolonged into a long snout, fifteen to twenty times its least width. The upper lobe of the tail is prolonged. There are three or four species. The common garpike, as it is called, is about three feet long. It is olivaceous in color, marked above with round black spots. It is found in the Great Lakes and large streams from New Jersey to Mexico. The short-nosed gar, three feet long, is found in the Mississippi River, and the alligator gar, six feet long, is found from Illinois to Cuba. The gar is covered with bony plates rivaling those of the alligator. The hide is thick. If dried it becomes as hard and as stiff as a tin can.

Gargantua. See RABELAIS.

Garibaldi, găr-ĭ-băl′dĭ, **Joseph** (1807-1882), an Italian patriot. Garibaldi was the son of a Nice sea captain, and liked the water better than he did his school. He took to a seafaring life early, and saw something of the Mediterranean world. He became a member of a secret revolutionary society that aimed to free Italy from foreign domination, and was forced to flee the country. From Italy he went indirectly to Brazil and took a hand in the broils of South America, espousing the cause of Uraguay against her larger neighbors. When the revolutionary times of 1848 came on he returned to Italy, and fought bravely against the French and Austrians but was driven from Rome a fugitive, and was obliged to flee again, this time by way of Gibraltar and Algeria to New York. In 1859 he returned to Italy, entered the service of Victor Emmanuel, and was an active leader in the wars for the unification of Italy. During the Franco-Prussian War he entered the French army and sat in the French Assembly. Few men have held more tenaciously to a fixed idea throughout a long, tumultuous life. Whether sailing the Mediterranean on his father's

ship, conspiring with the young men of Genoa, fighting the battles of Uraguay, raising cattle on the Pampas, defending the barricades of Rome, fleeing from peasant hut to hut in Italy leaving his dying wife to be buried by strangers, making candles in New York City, commanding a merchantman on the Atlantic, or leading his red-coated soldiers on the slopes of Sardinia,—whether dining with an English lord and resting in fine linen or eating a sausage with a sailor in a back alley, he was at all times the same simple, rugged, unselfish, incorruptible, fearless Joseph Garibaldi,—the friend of the people, a man with one idea,—the freedom and liberty of the Italian people. When his work was all done, refusing honors, office, and emolument, he retired in a dignified manner to the island of Caprera and ended his days—thus fulfilling his lifelong ambition—under the blue skies of a free and independent Italy. The list of emperors and generals connected with Rome and the peninsula of Italy is already much too long for remembrance, but the student of history cannot afford to overlook the name of Garibaldi. See ITALY; CARBONARI.

Garland, Augustus Hill (1832-1899), an American statesman. He was born near Covington, Kentucky, but while he was very young his parents took him to Arkansas. In 1853 he was admitted to the bar in that state. He was opposed to secession, but like so many other prominent southerners followed the lead of his state. Throughout the Civil War he was a member of the Confederate congress, most of the time as a senator. In 1874 he was elected governor of Arkansas, and three years later became United States senator from that state. In 1885 President Cleveland made him attorney-general.

Garland, Hamlin (1860-), an American novelist. He was born in West Salem, Wisconsin. He has written stories of Western life. *Main Traveled Roads, A Little Norsk, Rose of Dutcher's Cooley, The Light of the Star, Wayside Courtships, Prairie Songs,* and *Hesper* are among them. Garland has written verse, also, and contributed critical essays and articles on a variety of subjects to the magazines.

Garlic, a small, bulbous plant closely related to the onion. Garlic is a garden vegetable much used by the people of Southern Europe in soups and other cooking. A "garlic breath" is even more pronounced than that produced by eating onions. The juice of garlic makes a cement for mending glassware. The juice is used as an ointment in case of fever. A wild garlic found in woodland pastures is eaten by cows in the springtime. It ruins the milk. The name is from an old Saxon word, *gar,* meaning a spear, having reference to the spear-like shape of the leaves. The same syllable appears in garfish. See ONION; LEEK.

Garnet, a common mineral, usually occurring as crystals imbedded in rocks. There are several prominent varieties, white, yellow, green, brown, and black, but chiefly red. The precious garnet prized as a gem is transparent and of a deep red. It is chiefly silica and alumina, and owes its beautiful color to a stain of iron. Beautiful garnets are obtained from the Navajo Indian reservation, Ceylon, and Greenland. The red garnet resembles the ruby, but it is a cheaper gem. The garnet was named for the red seed of the pomegranate. The name was formerly spelled granate. See CORUNDUM.

Garnishment, the legal process of seizing the chattels or rights of the defendant in a suit, but which are held by a third party, and applying them to the plaintiff's claim. This is not a common-law process, but is regulated by statute in numerous states. The most common application of the process is the seizure of the wages of a debtor to satisfy the claims of a creditor. In some states, however, persons in certain industrial categories are not liable to suits involving their wages.

Garonne, a river in southwestern France, rises within the Spanish frontier at the base of Mount Maladetta, in the Pyrenees; it enters the Bay of Biscay at Point de Grave. After uniting with the Dordogne, 20 miles below Bordeaux, it forms an estuary, which is called the "Gironde." This estuary, the largest in France, is nearly 50 miles long. The total length of the river is about 346 miles, and it drains an area of about 22,020 square miles. Ocean steamers go up as far as Bordeaux, and the river is navigable be-

yond Toulouse. The Garonne is subject to overflows; one inundation occurred in 1875, when damage to the amount of $17,000,000 was caused.

Garrick, David (1717-1779), an eminent English actor. He was descended from a Huguenot family that fled from Bordeaux to England on the revocation of the Edict of Nantes. David's father was an army officer. His mother resided at Lichfield, where the lad attended the grammar school kept by Samuel Johnson. In later London days, when Garrick was the greatest actor of his age, and Johnson was the recognized authority on literary matters, Garrick used to amuse his friends by relating anecdotes of Johnson and mimicking his eccentricities. His reputation was made chiefly at Drury Lane Theater, where he acted many of Shakespeare's characters, among others Hamlet, King Lear, and King Richard. He was the first of the great English actors who have made these plays stage classics. His remains were buried in Westminster Abbey near the Poets' Corner. See DRAMA; ACTOR.

Garrison, William Lloyd (1805-1879), an American reformer and abolitionist, was born at Newburyport, Mass. After serving an apprenticeship as compositor, he became editor of the *Free Press*, and later published *The Liberator,* which was devoted to the cause of anti-slavery. He was the organizer of the Anti-Slavery Society. After the close of the Civil War the publication of *The Liberator* was discontinued. His friends made up a purse of $30,000 to provide for his old age. A statue has been erected in his memory in Boston.

SAYINGS.

The right to enjoy liberty is inalienable.

Every man has a right to his own body, to the products of his labor, to the protection of law, and to the common advantages of society.

I will be as harsh as truth, and as uncompromising as justice.

Urge me not to use moderation in a case like the present! I am in earnest; I will not equivocate; I will not excuse; I will not retreat a single inch; and I will be heard.

Garter, Order of the, the highest order of British knighthood. The order was established by Edward III about 1344-1350. The garter is a blue velvet ribbon, edged with gold, and having a gold buckle. It is worn on the left knee, or, if the sovereign be a woman, on the left arm. Other insignia are the badge known as the Great George, the Lesser George, the star of eight points, and the vesture, consisting of a blue velvet mantle, a crimson hood and surcoat, a hat of black velvet set off with a plume of white ostrich feathers, and a tuft of black heron feathers. The king and the Prince of Wales are members; farther membership was once elective, but it is now a mere social honor extended by the king. The honor may be conferred on foreign sovereigns. The whole order numbers about fifty knights. The motto of the order is, "Evil to him who evil thinks."

Garter Snake, a harmless striped snake of North America, common from Central America to Canada. It is found in meadows and around water courses. It is marked by three stripes along the back and each side, the color varying from light green to dark olive.

Gary, a city of Lake County, Indiana, the site of the largest steel plant in the world, is situated on the south shore of Lake Michigan, 29 miles from Chicago, and on the New York Central, the Michigan Central, the Pennsylvania and several other railroads. The city has a good harbor and is conveniently located for receiving iron ore from the Lake Superior region and fuel from the great coal mines to the south.

In 1905, the site of Gary was a barren waste of shifting sand and scrub oak trees. In 1906 the Indiana Steel Company, a branch of the United States Steel Corporation, began the erection of the first steel mills, and by 1920 the city embraced more than a dozen of the great manufactories of the country. In 1910 the population was 16,802. In 1920 it was 55,738. Over 60 per cent. of the inhabitants are foreigners and they represent about 35 nationalities. The school system is unique. The time of the pupils is about equally divided between vocational and academic studies. The Y. M. C. A., the Gary- Carnegie Library, the school buildings and churches are the chief public buildings.

Gary, Elbert Henry (1846-), an American judge and prominent corporation of-

ficial. He was born at Wheaton, Ill., educated at Wheaton College and at the University of Chicago, admitted to the Illinois bar in 1867, and was mayor of Wheaton for two terms and county judge of Dupage County for two terms. Judge Gary practiced law in Chicago for 25 years, serving many times as railroad and corporation counsel, and during 1893-94 was president of the Chicago Bar Association. He was prominent in the organization of the Federal Steel Company and retired from legal practice to become the president of the corporation. The conflict between the Carnegie, Frick and Morgan interests at the time the so-called "steel trust" was organized was ended only when an executive having no factional bias was secured. Judge Gary was the man. Judge Gary has partially removed the likelihood of conflict between the United States Steel Corporation and its employes by inviting the latter to become stockholders in the company, selling them shares on easy payments and at less than market prices. Thousands of the corporation's employes have responded to the offer. Judge Gary is frequently referred to as the "statesman of industry."

Gas Engine, a type of engine driven by the explosion of a mixture of gas and air within the cylinder. The gas derived from gasoline is so often utilized that the so-called gasoline engine is the most common form. Valves control the entrance and exit of the gases. Ignition of the gas to produce the explosion is usually by an electric spark from a battery or a magneto. To secure uniformity in motion with such intermittent impulses, a heavy flywheel is required or additional cylinders alternating in explosions are used. Two, four, or even six cylinders are common to secure smoothness as well as power in the running of automobiles. The speed is regulated by a governor which controls the number of explosions. To keep the cylinder cool it is surrounded by a water jacket.

Gas engines have come into very general use as a result of several distinct advantages over steam engines. They can be made in small sizes, occupy but little space, require no boiler with consequent danger of explosion, need no skilled engineer to operate, nor do they require constant attention. Then they may be started without having to fire up and generate steam and there is no waste of energy after closing down. The efficiency is approximately twice that of the steam engine, and with a cheaper fuel would still further displace that most useful machine. The wide use of the automobile is largely due to its engine, usually gasoline; and the success in present day aerial navigation is dependent in large measure upon the light weight, high power motors of this type.

Gas, Illuminating, gas burned to produce light. Illuminating gas is of two kinds, natural and artificial. A natural gas is found in vast quantities, apparently produced by natural distillation from petroleum oil pools within the earth's crust. When a well is drilled into a cavern of gas, it rushes out with extraordinary force, pressure being sometimes as high as 800 pounds to the square inch. This gas has all the useful properties of kerosene oil. In the states bordering on the Ohio River extensive systems of pipes have been laid from gas wells to the principal cities. In this manner natural gas is introduced into manufactories, stores, hotels, and residences, to furnish power, heat, and light. The only expense is that of first laying the pipes. After a gas well has been used for a time, the pressure diminishes. When the pressure becomes too slight to force gas through the jets in the distant cities, it becomes necessary to seek a new well with which to connect the system of pipes. It is claimed by the experts of the United States geological survey that natural gas to the amount of 1,000,000,000 cubic feet, enough to light and warm a city of 100,000 inhabitants, is allowed to escape daily. Cities of California, Ontario, and China also use natural gas. Gas does away with the nuisance of smoke and ashes.

Artificial illuminating gas may be made from tar or petroleum, but it is obtained largely by heating soft coal. The gas rises from the coal and passes through pipes into a huge reservoir or gas receiver. This receiver is curiously constructed. It consists usually of a huge cylinder closed at the upper end, and working up and down, either in several sections like a tele-

scope or else with the lower rim in a tank of water. This cylinder stands in a circular frame. Cords from the cylinder run over pulleys and are weighted at the outer end. The gas is introduced into the cylinder from below, and is driven by weight of this movable dome through street mains and supply pipes to the gas jets in the various street lamps and buildings where it is to be consumed. By changing the weights on the outer ends of the supporting cords, the weight of the movable cylindrical receiver may be varied at will. In cold weather the settling weight of the huge cylinder requires to be much greater than in midsummer. When gas is being manufactured rapidly, the receiver rises; during the hours of rapid consumption, the receiver sinks. This is why the height of a gas house changes so surprisingly.

Inasmuch as it is necessary to tear up the streets to put in gas mains it is public policy to give a single company the exclusive right to manufacture and supply gas in a given city or district. In return for this privilege a city council is entitled to fix just prices for which gas must be supplied, to insist that all consumers who desire gas shall be permitted to have it, and to require that the gas supplied be of proper quality. Much difficulty has arisen in adjusting these questions of price and quality, however, owing to the impracticability of securing city councils disposed to protect public interests and at the same time do justice to those who have invested their money in building gas plants.

The amount of gas used by each consumer is determined by a gas meter or system of clockwork set in motion by the gas in passing through the supply pipe. The price is fixed usually at so much per thousand cubic feet. It varies greatly in different parts of the world. Some of the elements which should determine the price of gas are the distance from a supply of suitable coal, the cost of transportation, the nature of streets through which mains must be laid, as to whether they are rocky or sandy, the total amount of gas consumed by the city, also the evenness of consumption. A manufacturing city that uses a great deal of gas in the daytime is entitled to a cheaper rate than the city that consumes the same quantity of gas in a few evening hours. Some cities solve the question by supplying their own gas at cost to consumers. Others are well satisfied with prices charged by private gas owners.

Illuminating gas is poisonous. At least it causes death. People should be careful not to go to sleep in rooms in which gas is escaping from leaky jets. Gas must be turned off by a stopcock or faucet. The light should never be blown out.

The light yielded by gas is expressed in candle power. The light produced by five cubic feet of gas per hour is compared with that produced by a candle burning 120 grains of sperm per hour. Coal gas has a lighting strength of 14 to 18 candles; water gas made from oil runs from 18 to 27; acetylene goes up to 240 candle power.

The first use of coal gas as a means of heating and lighting is ascribed to an inventive Ayrshire Scotchman, William Murdock, who lived in 1754-1839. While in the employ of a mining company in Cornwall in 1792, he distilled gas from coal and lighted his office and workmen's cottages.

One of the first great structures to be lighted by coal gas was Westminster Bridge across the River Thames in London. But for many years its general introduction for house-lighting was delayed by the popular fear that it would cause fires. It was difficult to remove from the minds of the people a belief that the gaspipes were filled with fire, and that the jets were simply openings through which the fire escaped. Plumbers were also partly responsible for the public fear of the new illuminant, for at first they did not know how to join the gaspipes so as to prevent leakage. Gradually, however, coal gas replaced candles and the oil lamp for illuminating purposes in cities and towns, and continued to be the world's chief illuminant until it was itself largely superseded for lighting purposes by electricity, although it is still in extensive use in many places for lighting and is supplied in all urban communities for cooking, heating and industrial purposes. Baltimore, Maryland, was the first American city to use gas for street lighting, in 1817, and a house at Newport, R. I., was the first American home lighted by gas.

WATER GAS. Carbureted water gas is

now largely used in many cities instead of coal gas. It is more cheaply manufactured, and can be furnished at a lower cost to the consumer. Its illuminating power is less than that of coal gas, unless it is burned with mantles, or special burners attached to the gas jet. It is made by decomposing steam in the presence of incandescent carbon so that the hydrogen is set free, and the oxygen unites with the carbon, giving carbon dioxide. These two gases, with small quantities of methane, carbon dioxide and nitrogen, form "water gas." It is combustible, but burns with a nonluminous flame, and for lighting purposes is mixed with gas made from oil. The usual addition is the vapor of some light volatile oil, like gasoline.

Water gas is made in a generator, which is a steel shell, lined with fire brick. This is filled with hard coal, or coke, which is brought to a state of incandescence, or made red hot, by a forced blast of air. When the blast is shut off, steam is admitted to the fire and its decomposition forms water gas. The gas is then led from the generator into a small gas-holder, and then over a series of steam-heated shelves on which oil is vaporized. The mixture of water gas and oil vapor then passes through retorts which are heated from the outside, and this heat completes the mixture, forming a crude carbureted water gas. This is then drawn from the retorts, condensed, and purified for sending through the mains to the consumer.

In another method of manufacture, the water gas is made and carbureted in one operation. The apparatus for this purpose consists of three steel cylinders, lined with fire brick, called the generator, carburetor and superheater. Anthracite coal is burned in the generator, and the other two cylinders are filled with fire-brick arranged in checkerwork. All the vessels being heated under forced draft, steam is turned into the generator and water gas is produced as in the process first mentioned. Oil is then admitted to the carburetor, vaporized by the heat of the checker brick, and carried by the water gas through the brickwork in the carburetor and superheater, where a permanent mixture of the gas and oil vapor is formed by the heat. The gas then passes through a water seal, is cooled in a condenser, and run into a holder. An exhauster then forces it into purifiers and through a station meter into a storage holder, from which it is distributed. This type of apparatus and process is now mostly used for the production of carbureted water gas, which has largely increased in use in the United States in recent years, so that probably 75 per cent of the illuminating gas sold today is carbureted water gas.

The total quantity of gas reported as sold in the United States for lighting and heating purposes in a recent year was approximately 157 billion feet, an increase of 130 per cent in ten years. The capital invested in the gas industry at that time was $915,000,000, and the total receipts for gas sold were $138,600,000, or about 92 cents per thousand feet. By-products of gasworks including tar, coke, and ammoniacal liquor, largely increased the receipts. See ACETYLENE; CANDLE; FRANCHISE.

Gaskell, Mrs. Elizabeth Cleghorn Stevenson (1810-1865), an English novelist. She was born at Chelsea, but was brought up by an aunt at Knutsford in Cheshire. She married Mr. Gaskell, a Unitarian clergyman, in 1832. Her first story, *Mary Barton,* was published in 1848. Among her other novels, are *Ruth, The Moorland Cottage, Cranford. Sylvia's Lovers, Cousin Phillis.* See CRANFORD.

Gasoline, an important, if not the most important, by-product of petroleum, is a coloress, volatile liquid that is highly inflammable. It has a characteristic odor. Owing to its volatility, gasoline must be kept in metal receptacles; and because of its inflammability, the law requires that it be stored underground.

PRODUCTION. Petroleum is refined by being placed in a huge metal retort, or still, and agitated, that is, stirred about, while being subjected to gradually intensified heat. It is thus separated into its component elements, the most volatile passing off first, the next, second, and so on. In the order of volatility, gasoline is second in the list of petroleum by-products. It is passed out of the retort through a coil, cooling as it goes. There are several grades of gaso-

line, the quality being dependent in large part upon the amount of distillation to which it is subjected after being distilled for the first time.

The most recently discovered source of a good quality of gasoline is the gas that escapes from petroleum wells through the casing head. This gas is very wet, and when precipitated, the liquid is put through a process of refining, and yields what is known as casing head gasoline. This method of production, begun after 1910 and at first slowly developed, has lately become of great importance. The amount of gasoline produced in 1920 alone by this method was 383,311,817 gallons.

Uses. Gasoline, when mixed with the proper amount of air in a chamber, is highly explosive, the quality that makes it such a valuable fuel for internal combustion engines. As the propelling force for motor cars alone it would be of great importance. But its true importance is realized when it is noted that gasoline is the fuel for farm tractors, trucks, aeroplanes, motor boats and many kinds of stationary engines.

One gallon of gasoline costing from twenty to forty cents a gallon, will do an amount of work about equal to that of six good horses, and is therefore relied upon by many agriculturists for plowing, harvesting and hauling. It will drive a light pleasure automobile and also the huge motor trucks used in large cities for hauling coal, cement, steel girders and other materials. A racing aeroplane traveling at the rate of 240 miles an hour is reliant on this fluid for its speed.

Amount of Production. Though the amount of gasoline produced is constantly increasing, there is grave danger that before many years the supply will be exhausted unless new petroleum fields are found, new methods of producing gasoline are discovered, or a proper substitute for gasoline is evolved. The largest producer of petroleum, and consequently, of gasoline, is the United States. Canada is furnished gasoline by the United States; and during the World War, when the value of this liquid as a motive force was appreciated as never before, the United States furnished the greater part of the millions of gallons consumed by the allies.

As exemplifying the rapidity of the increase in gasoline production in the United States alone, the following figures for five years, furnished by the United States Department of Commerce, are important:

Year	Gallons
1917	2,850,546,423
1918	3,570,312,963
1919	3,957,857,097
1920	4,882,5 :6,649
1921	5,153,549,318

Gasoline was once a waste product of refining, kerosene outranking it in importance. Today the situation is reversed, and the market is flooded with kerosene, for which little use can be found. A few specially constructed engines use kerosene for fuel, and experts are striving to perfect kerosene-burning engines that may be put to use as generally as is the gasoline motor.

Gassing. See Singeing.

Gastric Juice, one of the digestive fluids. It is a clear, colorless liquid, with a salty taste and an acid reaction. The gastric juice is manufactured in gastric cells or glands, situated in the inner lining of the stomach and opening into its cavity. The amount secreted is large, equaling in weight about one-eleventh of the human body daily. Only a portion is in the stomach at any one time. The chief ingredients are three—hydrochloric acid, rennin, and pepsin. The first element preserves food from decay, dissolves nitrogenous food, and softens tissues. Rennin curdles milk. Pepsin produces a change in nitrogenous foods that prepares them for absorption. Oils and fats are not digested by the gastric juice. The mixture of gastric juice and food produces a grayish liquid known as chyme. See Pepsin.

Gates, Horatio (1728-1806), an American general. He was born in England. He came to America in 1755 and served as a captain in Braddock's expedition. At the beginning of the Revolutionary War he was made adjutant-general. He was appointed to the command of a part of the American forces. He was sent north to oppose Burgoyne, and was in command at the time of Burgoyne's surrender. This success, coming as it did at a time when

Washington met with reverses, gave Gates an exaggerated opinion of his own ability. Many patriotic men, including Samuel and John Adams, with their New England prejudices, thought Gates an abler man for the chief command than the Virginian Washington. Dr. Rush of Philadelphia sided with them. Through their influence, Congress created a board of war with Gates at its head, thus placing him in virtual command over Washington. Gates then entered into a conspiracy with other officers to displace Washington. This disgraceful coalition is known in history as the Conway Cabal, named from the officer who was most active as Gates' tool in the matter. The plans of the cabal became known, however. It was broken up. Gates was assigned to a subordinate position with orders to report direct to Washington. He was later placed in command of the southern army, but met with a severe defeat at Camden and was court-martialed. His entire career rests under a shadow. See CONWAY CABAL.

Gatling, Richard J. (1818-1903), an American inventor. He was a native of North Carolina. He was possessed of unusual mechanical ability. Among his inventions are a machine for sowing rice, a wheat drill, a hemp brake, and a steam plow. He is known best, however, as the inventor of the Gatling gun. It was used for the first time during the peninsular campaign conducted by General Butler on the James River. It consists essentially of ten gun barrels fastened in a parallel position to a central shaft. They are turned by a crank. Cartridges are set into the breech through an electrical arrangement called a hopper. The Gatling gun is a terribly destructive piece of ordnance. As high as 1,200 shots can be fired per minute. By swinging the muzzle slowly to right and left the horizon may be swept by a veritable leaden hail.

Gatling Gun. See GATLING, RICHARD.

Gaul, in ancient geography, the country of the Celtic people known as Gauls. Our knowledge of the Gauls and their country is derived chiefly from Caesar's *Commentaries on the Gallic Wars*. Gaul in Caesar's day included a part of Italy and the vast extent of territory extending from the Rhine to the Pyrenees. Several important migrations took place. In 390 B. C. the Gauls sacked Rome. A colony intrenched in Asia Minor was known to the Apostles as the Galatians. France is sometimes called Gaul. See CELTS.

Gaultheria, a genus of heath-like evergreen aromatic plants and shrubs. The genus was named for Dr. Gaultier, a Canadian physician. It includes about ninety species of North America, the Andes, and eastern Asia. For a description of the best known species, see WINTERGREEN.

Gauntlet, or **Gantlet,** in medieval armor, a glove, usually of leather covered with iron, which formed a part of the equipment of knights. They were introduced in the thirteenth century, and it was a custom to throw one of them down as a challenge. In heraldry, the gauntlet for the left hand was expressed by the word *sinister,* for the right, *dexter*. Since the left side was regarded as unlucky the term *sinister* now means inauspicious, dishonest or of ill report.

Also a kind of military punishment in which the prisoner, stripped to the waist, had to run between two files of soldiers armed with sticks or other instruments with which they struck him as he passed. Hence the term "running the gauntlet."

Gautama, the name of a family and of several individuals connected with the early Vedic literature of India. It was the name of a Hindu lawgiver, who was the author of the Institutes of Gautama. These were legal aphorisms in early Hindu law. See BUDDHA.

Gavelkind, a law or custom of inheritance by which the property of the parent is distributed to all the children alike. It is the general practice in civilized countries, save in parts of England and certain other districts where a desire to keep fine estates together as a whole has led to giving the chief part of a man's estate to his oldest son, according to the so-called law of primogeniture. According to one form of gavelkind all the sons come in for a share of the land, but the daughters are left out. Gavelkind is the common law of France and of Germany. It is still the law in many parts of Great Britain. In a rural

community gavelkind results in many small farms. See GERMAN EMPIRE; INHERITANCE.

Gavial, gā′vĭ-al, a long-bodied, long-nosed crocodile of India, with a hundred even teeth, and fleshy, horn-like nostrils at the end of the upper jaw. The gavial attains a length of ten to twenty feet, and is an unpleasant animal to look upon; but it is not dangerous to man or beast. It lives in the fresh waters of Borneo and India. It feeds on fish. It is to be distinguished from the man-eating crocodile. The stout snout of the Mississippi alligator is about twice as long as it is wide. The slender snout of the gavial is several times as long as it is wide. See CROCODILE.

Gay, John (1685-1732), an English poet. He was born at Barnstaple, Devonshire. His father died when young (Gay was a child of six), leaving his widow with four children. After attending the grammar school of Barnstaple John was apprenticed to a silk mercer. Disliking this employment he gave it up, and devoted his time to literature and to efforts at securing the patronage of the influential. He soon became well known as a writer of farce and tragedy. He was of a temperament to win friends, and his writing was of a character to win popularity. He was a contemporary of Pope and Dryden. He secured the patronage of the Duchess of Monmouth, and in 1712 was received into her household in the capacity of secretary. Here, Thackeray tells us, he was "lapped in cotton, and had his plate of chicken, and his saucer of cream, and frisked, and barked, and wheezed, and grew fat, and so ended." His chief work for the stage is *The Beggar's Opera,* which ran for sixty-three nights. A sequel, *Polly,* was refused a license by the lord-chamberlain. This refusal caused so much excitement and discussion among Gay's friends and acquaintances that it is said that "the inoffensive John Gay became one of the obstructions to the peace of Europe." Unlike many writers whose fame has been more enduring, Gay was financially successful. At his death he left £6,000 to his two widowed sisters. He was buried in Westminster Abbey. Among Gay's other writings may be mentioned *The Shepherd's Week* and *Trivia.* His *Fables* are humorous poems and are still read and enjoyed. He is best known by the ballad of *Black Eyed Susan,* a favorite among sailors. His writings are more or less flippant. A few of his coins are in general circulation:

Midnight oil.
Two of a trade can never agree.
I thought so once, but now I know it.
Over the hills and far away.
While there is life there's hope.

How happy could I be, with either,
Were t' other dear charmer away!

SAID OF GAY.

John Gay was one of those easy, amiable, good-natured men whose talents excite admiration without jealousy, while their characters are the object of fondness rather than respect.—Thomas B. Shaw.

Of manners gentle, of affections mild,
In wit a man, simplicity a child.—Pope.

It may be safely said that no man could have acquired such a body of great and accomplished friends as those which rallied round Gay and mourned his loss, without the possession of many valuable and endearing qualities. His poetry is neither high nor pure; but he had humor, a fine vein of fancy, and powers of observation, and local painting which bespeak the close poetical student and the happy literary artist.—Robert Carruthers.

Gay-Lussac, gā-lü-säk′, **Joseph Louis** (1778-1850), a brilliant French chemist. As a student of the Polytechnic School of Paris he attracted the attention of the professor of chemistry, and a few years later he was appointed to a chair in that institution. He also subsequently held various positions under the French government. In 1804 Gay-Lussac made a balloon ascent for the French Institute to ascertain how a magnetic needle would act above the surface of the earth. He found no perceptible difference. He reached a height of 23,000 feet and brought down a supply of upper air which was found to be identical with surface air. Gay-Lussac took an active interest in the making of gunpowder and the working of the French mint. As chemist of the Jardin des Plantes, the French botanical garden, he took an active interest in botany; the Gaylussacia or huckleberry of our northeastern woodlands and swamps was named for him. The final claim of Gay-Lussac to scientific renown rests on an enunciation of a law to the effect that,

when certain volumes of gases are combined, the result will be even and not fractional volumes. For instance, if two volumes of one gas be united with one volume of some other gas the result may be a heavy gas of one volume or a gas of two or it may be a gas of three volumes, but it will not be fractional, as a volume and a half or two and a half volumes, etc. Stated more scientifically, "When chemical action takes place between gases, the volume of the gaseous product bears a simple relation to the volumes of the reacting gases." See CHEMISTRY.

Gazelle, gȧ-zĕl′, a small antelope found in the deserts of Egypt, Arabia, Syria, and Persia, where it is seen in large herds. It is about two feet in height, and is the fleetest of all quadrupeds. The gazelle is noted for the exquisite beauty of its form. Its eyes are large, dark, and lustrous. Oriental women are supposed to be much pleased when told that they have the eyes of a gazelle. The given name, Dorcas, is the Grecian word for gazelle. Before the day of the rifle gazelles were hunted with the falcon and the greyhound. Flying at the gazelle's eyes the falcon was able to retard its movements until the greyhound could come up. Gazelles are tamed by the Syrians, but, like wild deer, they long for the free life of their relatives. There are in all over twenty species. See ANTELOPE.

Gecko, a lizard belonging to a large order of reptiles, of which there are nearly 300 species. They are found in the warmer regions of the earth's surface. Almost all are nocturnal in their habits, and their food is flies, mosquitoes, and other insects. The gecko's construction is such that it is able to ascend a perpendicular wall, and walk inverted on a ceiling. During the day it lies hidden in dark, damp places, and comes forth at evening to get its food, when it utters a short, sharp chirp. In Italy the Gecko is called *terrentolo,* in Provence *tarente,* and by the Romans it was called *stellio.*

Geijer, yī′er, **Eric Gustaf** (1783-1847), the most noted of Swedish historians. He was born at Ransäter, Wermland. He began to lecture at Upsala University at the age of twenty-three and was made professor of history in 1817. Geijer was a man of many talents, his very versatility impeding advancement in any one line of which he was really capable. He is known widely in his own country as a poet and musician, as well as a historian, and he was influential also in politics. He was foremost among the founders of the "Gotische Bund," or Gothic League, or School, which aimed at a national spirit and character in literature. This organization published a periodical called *Iduna.* As in the old myth the "apples of Iduna" restored youth to the gods who began to feel the approach of age, so the Gothic School aimed to revive the national spirit which of old bound the Gothic race together as one family. The Gothic School turned its attention to the myths and legends and the history of ancient Scandinavia, and soon gained an ascendency over the "Phosphorists," as those writers were called who favored the romantic element in literature.

Geijer wrote stirring lyrics and ballads which hold an important place in Swedish literature. He planned several vast historical works, not one of which he was able to complete, but which, even in their unfinished state, are of the highest importance. *The Chronicles of Sweden* was the title given a work designed to embrace the history of the country from the earliest mythological ages to the present time. The first volume only was completed. It is a valuable inquiry into the sources of eárly history. Other titles are the *History of the Swedish People, The Condition of Sweden from the Death of Charles XII to the Accession of Gustavus III,* and *Feudalism and Republicanism.*

The *Chronicles of Sweden* presents all that belongs to the North, its gods, its mythic doctrines, its grand traditions, its heroes, vikings, runes, and poets, carrying whole ages of history in their trains. In Geijer's hands the dry bones of history and chronology live like the actual flesh and blood of the present time.—Botta.

Geikie, Sir Archibald (1835-) a celebrated Scotch geologist, considered one of the world's greatest geological authorities. He was born at Edinburgh and attended the university there. After becoming a

member of the Geological Survey of Scotland, Sir Archibald was made director of that body in 1867. During 1871-1882 he held the chair of geology and mineralogy in the University of Edinburgh, resigning to become director general of the Geological Survey of the United Kingdom. Sir Archibald's geological text books have been extensively used in Europe and in the United States. Concise expression and a wise sense of values mark all his published works, which include *Field Geology*, *Text Book of Geology*, *Ancient Volcanoes of Britain*, *The Story of a Boulder* and *Love of Nature Among the Romans*.

Geissler's Tubes, tubes made of hard glass and filled with rarified gases, as nitrogen, oxygen, hydrogen, etc., and fitted at each end with an electrode so that an electric current may be passed through the gas. These tubes invented by Heinrich Geissler, a German maker of scientific instruments, are of various shapes, and the color of the light produced when a current is passed through them depends on the shape of the tubes, the kind of gas they contain and the amount of the refraction of the gas. When these conditions are varied, some very beautiful effects are produced; and the tubes have scientific value, as their use permits of the examination of incandescent gases with the spectroscope.

Gelatine, jĕl′ă-tĭn, a substance obtained by dissolving the gelatinous portions of animals. Gelatine of animals corresponds to the juices of fruit and plants. It is obtained chiefly from horns, hoofs, tendons, cartilage, bones, and portions of hides. In a particularly pure form, derived from the air bladders of certain fishes, especially the sturgeon, it is called isinglass. In a crude form, gelatine is the glue of commerce. Pure gelatine capsules are used by druggists to contain doses of disagreeable medicine. Gelatine plates serve a useful purpose in photography. Gelatine in its various forms is now one of the important by-products of packing houses. See Isinglass; Glue.

Gelee, Claude (1600-1682), a celebrated French landscape painter who is best known as Claude Lorrain, after his birthplace. He was born in the village of Champagne, the third of his lowly parents' five children. Orphaned at 12, M. Lorrain was forced to gain a livelihood. At 16 he was in Rome. There he saw the landscapes of a Flemish painter, Godfrey Walls. He went to Naples and lived and studied with the Fleming for two years. On his return to Rome M. Lorrain found employment in the studio of another painter; later he studied in Germany and in France. During this time his genius was maturing, and the technical perfection and tonal harmony of his later work is marvelous. He is the most important classical landscape painter of the 17th century. The warm, rich color, and the reflections of light in sky, cloud and water are the finest qualities of Lorrain's work. In order that no fraudulent copies of his work should be sold, he made tinted outline drawings of his pictures. These drawings he signed with the name of the purchaser. He gathered them into book form and called them *Libri di Verita*. His finest works include *Hagar in the Desert*, *Embarkation of St. Ursula*, *Seaport*, *Landing of Cleopatra at Tarsus*, *Flight into Egypt* and *The Village Dance*.

Gelsemium, or **Yellow Jasmine,** a climbing shrub, easily recognized by its glossy, opposed lance-shaped leaves, and cluster of large yellow funnel-shaped flowers, which are very fragrant. The root-stock often extends under ground for some distance. Gelsemium is a native of the United States. It grows on rich clay soil along the banks of streams, and is common from Virginia southward to Florida and Texas. The root-stock and rootlets are the source of a powerful drug, having the same name as the plant.

While Gelsemium may be used by physicians in case of malarial fever, rheumatism and neuralgia, it is a powerful poison, a slight overdose being fatal. Drooping of the eyelids and pain in the forehead and eyeballs are the first symptoms of an overdose. Carbonate of ammonia, aromatic spirits of ammonia and morphine are the best antidotes.

Gem, a precious stone. The use of the term implies that the stone has been cut and polished for ornamental purposes. The

GEMS

1, 2, 3. Topaz.
4. Spinel.
5. Beryl.
6, 7, Sapphire.
8, 9. Tourmaline.
10, 11. Opal.
12, 13. Almandine.
14, 15. Amethyst.
16. Chrysoprase.
17, 18, Ruby.
19, 20. Garnet.
21. Hyacinth.
22. Chrysoberyl.
23. Bloodstone.
24, 25. Turquoise.
26, 27. Emerald.
28, 29. Diamond.
30. Lapis Lazuli.

list of gems is a long one. The principal stones are the carnelian. chalcedony, onyx, sardonyx, agate, emerald, jasper, garnet, jacinth, ruby, beryl, amethyst, sapphire, lapis lazuli, topaz, turquoise, tourmaline, opal, and diamond. The art of engraving precious stones is as old as civilization itself. A gem cut so that a figure stands up is known as a cameo. In case the figures are cut out of the stone, so as to form depressions, the gem is an intaglio. Skilled workmen are able to imitate most gems in various sorts of pottery, porcelain, and glass. Separate articles may be consulted on the principal precious stones. As in the case of flowers, many gems have particular significance, the origin of which it would be difficult to trace. The astrologer claimed that the onyx was under the influence of Saturn; the carnelian, of Jupiter; the diamond, of Mars; the sapphire, of the Sun; the emerald, of Venus; the lodestone, of Mercury; and the crystal, of the Moon.

In sentimental matters each month has its gem, and, like flowers, each gem has its significance. The following table carries with it at least the authority of long established tradition:

January...	Garnet.....	Constancy.
February....	Amethyst....	Sincerity.
March.....	Bloodstone..	Courage.
April.....	Diamond....	Innocence.
May.....	Emerald....	Success in love.
June.....	Agate.....	Health and long life.
July.....	Carnelian....	Content.
August.....	Sardonyx....	Conjugal felicity.
September...	Chrysolite...	Antidote for madness.
October.....	Opal.....	Hope.
November...	Topaz.....	Fidelity.
December...	Turquoise...	Prosperity.

Gemini. See CASTOR AND POLLUX.

Gemsbok, a large antelope of South Africa. The scientific name is *Oryx Gazella.* It is known also as the Cape Oryx. This antelope is a native of South Africa. The general color is yellowish with conspicuous black and white markings on the head, legs, and flanks. The neck and shoulders bear a mane. The tail is tufted. The gemsbok is a noble, large beast of the Kalahari Desert. It is provided with a pair of straight, tapering horns, two-thirds as long as its body. Unless able to leap from the rear when the animal is off guard, the lion is cautious of its charge. The rifles of Boer and Briton keep the gemsbok from the more accessible plains. See ANTELOPE.

General, a military title. The commander of an army. In the United States a general outranks a brigadier-general, a lieutenant-general, and a major-general. The rank was created by Congress in 1799 and conferred on George Washington as a mark of honor after his retirement from the presidency. After his death the office remained vacant until 1802, when it was abolished. At the close of the Civil War the rank was revived and conferred on Grant as a reward for his military services. On Grant's accession to the presidency the office passed to General Sherman. It lapsed with his retirement in 1883, but was revived in 1888 for Sheridan. With Sheridan's death the office became extinct. It was again revived in 1919, however, and conferred upon John J. Pershing, and since then upon Tasker H. Bliss and Peyton C. March. See ARMY OF THE UNITED STATES.

General Education Board. This Board was chartered by Congress in 1903 to promote education in the United States, specifically to assist in the distribution of large gifts for educational purposes. Through this board assistance is given schools of all grades from the primary school to the university without distinction of race, creed or color. The board has been especially helpful in advancing education in the South.

The annual report for the year ending June 30, 1921, showed that since its organization the board had aided 207 institutions, that its total appropriations amounted to $48,665,639, and that these institutions were required to raise $169,413,000. Mr. John D. Rockefeller's gifts to general education had at the date given above amounted to $126,788,000.

Genesis, the first book of the Old Testament, and of the Bible. In the Hebrew original, as well as in the Septuagint and all modern versions, it occupies this place. It is called in Hebrew "b'reshith," which is its initial word, correctly translated in the authorized English version, "In the beginning." The opening chapter narrates the creation by God of this earth and all worlds (i:1-16); then follow events in the

history of the human race generally. At xi:10 a genealogy begins, designed to give the pedigree of Abraham. The remainder of the book gives the history of Abraham, and his descendants, Isaac, Jacob and the twelve patriarchs. Genesis covers a vast period of time, the exact number of years being variously estimated. In early Jewish times and in early Christian history Genesis was thought to be the work of Moses. To this day, however, the theories as to the origin and authenticity of Genesis have been innumerable, biblical scholars and other learned men having sought in vain to settle the matter.

Genet, zhĕ′nā, **Edmond Charles** (1765-1834), a French diplomatist. He was born at Versailles, then the magnificent seat of the extravagant Louis XV. When but twenty-four years old he went to St. Petersburg where he spent three years in diplomatic service. During Washington's first administration Genet was sent to the United States as minister plenipotentiary, with instructions to induce the country to declare war against England. Washington had issued a proclamation of neutrality, but Genet was received so enthusiastically by Americans in sympathy with France that he disregarded it and set about equipping privateers for war on the sea. He was warned to stop by Jefferson, then secretary of state, but paid no attention. Finally Washington had him recalled. He dared not go back to France, so became an American citizen and settled in New York, where he married a daughter of Governor George Clinton. See DIPLOMATIC SERVICE.

Geneva, je-nē′va, the largest city in Switzerland. It lies at the southwestern end of the lake of that name. It is situated on both sides of the river Rhone, the blue waters of which issue here as though propelled by hydraulic pressure. The two parts of the town are united by numerous bridges on which tourists never weary of congregating to watch the swift, arrowy current. The site of the city is a beautiful one. It is a charming place of residence. The summers are cool. In winter it is sheltered. Both banks of the lake are studded with villas with attractive gardens. Mountain paths in the vicinity command a magnificent panorama of the basin of Lake Geneva. The Jura Mountains, Mont Blanc in the distance, and the entire chain of the Savoy Alps, with the exquisite sunsets for which Switzerland is noted, are nowhere seen to better advantage than at Geneva. Over 120,000 travelers register yearly at the Geneva hotels—about 12,000 are from the United States and Canada. The town, itself, with its suburbs, contains about 125,500 inhabitants. It is noted for the manufacture of watches. A university maintained by the city attracts many students. It has large collections of antiquities, coins, medals, insects, and minerals. A botanic garden laid out by the celebrated De Candolle, a handsome theater, an art museum, and a conservatory of music add to the attractiveness of the city. The university is open to women. It is the leading Protestant university conducted in the French language.

Geneva, with the canton of that name, is now a member of the Swiss confederation. It was for centuries, however, a small republic, independent of the great powers of Europe. For this reason it was the refuge of intellectual people who were persecuted by the despotic governments of Germany, France, Italy, and Russia. Many of the inhabitants are of Huguenot descent. The prevailing language is French; the prevailing religion, Protestant.

Like other small countries, the territory of Geneva was subject to political revolutions of violence and intensity quite out of proportion to the size of the country, and was on that account the subject of more or less sport. "When I shake my wig," said Voltaire, "I powder the whole republic." Emperor Paul of Russia spoke of one of these revolutions as a tempest in a glass of water. Geneva has exercised an influence on the world's thought quite out of proportion to its size, rivaling Florence in this respect. Various revolutionary ideas have emanated from it. Calvin, the founder of Presbyterianism, resided here; Rousseau was born at Geneva; the botanist, De Candolle, Necker, Minister of France, and his daughter Madame de Staël, were natives of Geneva. Voltaire was long

a resident here. We may say, therefore, that Geneva has played an important part in the history of the intellectual and social progress of Europe.

The present canton has an area of 108 square miles, a population of 154,159, and seven representatives to the Swiss National Council. See RHONE; CALVIN; VOLTAIRE; SERVETUS.

Geneva Award. See ALABAMA CLAIMS; ARBITRATION.

Geneva Convention. See RED CROSS.

Geneva, Lake of, the largest body of water in Switzerland. It is known also as Lake Leman. It is about fifty miles in length and has the form of a new moon, with the points turned toward the south. Its greatest width is six miles; its surface is 1,230 feet above the sea level; its greatest depth is 1,014 feet. The lakes of Switzerland are usually greenish in hue, but the waters of Lake Geneva are of a deep blue. Sir Humphry Davy attributed this color to the presence of iodine, but his view is not now accepted. There are twenty-one different kinds of fish in the lake, but they are not abundant. Sail-boats, with the peculiarly graceful lateen sail seldom seen away from the Mediterranean, are in use. The lake is never frozen over. Waterfowl winter here. The shore is, for the most part, a lofty mountain wall, or else it falls away in graceful slopes, clothed with vineyards and orchards and dotted with beautiful villages, rendering Lake Geneva one of the most picturesque bodies of water in Europe. Lying as it does in a great mountain cup, atmospheric pressure sometimes causes the waters to surge up unexpectedly in places to a height of several feet. Storms are numerous and dangerous, though nothing can be more charming than the surface of the lake in fine weather when pleasure steamers are abroad. See CHILLON.

Genghis Khan, jĕn′gĭs kän (1162-1227), a noted chieftain of Mongolia. His father was a petty chieftain who paid tribute to the khan of Tartary. Genghis was a born intriguer and ruler. He united various Tartar and Mongol tribes under his leadership, broke through the great wall of China, and subjugated that country. In 1215 he took Peking by storm and allowed it to be plundered by his soldiers. Three years later he invaded Turkestan with an army of three quarters of a million men. He extended his conquests until the entire territory from the Pacific Ocean to the Dnieper River in Europe was under his rule. At his death his immense empire, like that of Alexander the Great, was broken up into fragments, the largest of which is now known as China. See TARTARS.

Genie. See FAIRY.

Genius, gēn′ĭ-ŭs (pl. **Genii**), in Roman mythology, a tutelary deity or protecting spirit. Every man was supposed to be accompanied from his cradle to his grave by two genii. The good genius brought all good things into his life, while the evil genius was responsible for whatever of unhappiness and misfortune fell to his lot. From his birth till his death, these two genii strove each for the mastery of his destiny. Not only was each man thus attended, but every created thing, every animal or plant or inanimate object, every stream or mountain or forest, had its peculiar genius. The nation also had its genius. In the vicinity of the Roman Forum a statue was erected to the national genius, and a representation of this figure is seen frequently on coins.

From this belief in the divine guardianship of the destiny of man, the peculiarities of mind and character which are closely associated with the career of each individual were ascribed to the genius. Thus arose the modern word, genius, to denote peculiar mental bent or faculty, as a genius for mathematics. The specific use of the word to denote superior creative gift or endowment implies that such gift is a part of his inborn nature, as the genii who were believed to guard his destiny were with him from the moment of birth.

The word genii has been used as a name for the djinn or jinn of the Orientals. The djinn, however, was a totally different being from the Roman genius. Djinns were of intermediate rank between angels and men, but inferior in dignity to both. They were created of fire, and were in-

visible to man. The djinns can assume any form of man or brute. They are usually the enemies of mankind, but, if subdued by the spells of powerful magicians, may be made to serve man, which they can do most successfully on account of their wonderful powers.

Genoa, jĕn′o-à, a city of Italy. It is situated on the Mediterranean Sea at the foot of the Apennines. The harbor of Genoa is a semi-circular body of water, about a mile in wi'th and of great depth. It is one of the safest anchorages in Europe. A lighthouse 300 feet high guides ships through the entrance. Viewed from the harbor, the city presents an imposing array of palaces, churches, terraced gardens, and orange groves, behind which rise ranges of hills surmounted by forts, batteries, and outworks. The interior of the city, however, is a labyrinth of narrow, dirty lanes, inaccessible to vehicles. Many of these thoroughfares, which are merely wide enough for the passage of pack mules, are lined with lofty buildings, once the residences of wealthy merchant princes. Among the principal buildings are the ducal palace, formerly occupied by the doges, and the palace of Andrea Doria, presented to him by the city in 1522. There are numerous museums and art galleries and public institutions, including a public library of 50,000 volumes. A magnificent monument has been erected to the memory of Christopher Columbus, who was born here. In the Middle Ages Genoa was a commercial rival of Venice. The city still has an extensive commerce. It exports $20,000,000 worth annually of olive oil, fruit, fish, steel goods, velvets, silks, damask, gloves, straw braid, artificial flowers, paper, soap, coral, macaroni, and marble. The population in 1915 was estimated at 300,139. See ITALY.

Genoa Conference, a conference on the economic condition of Europe held upon invitation of the Italian government, at the Royal Palace, Genoa, in April, 1922. Delegates representing 33 nations attended the conference. The United States was not officially represented, but Richard Washburn Child, American ambassador to Italy, was present as an unofficial observer.

While expressing a strong desire for the success of the conference, the United States found it necessary to decline the invitation, chiefly on the ground that the conference would have to give its attention mostly to the political affairs of Europe, affairs in which the United States could not participate. A minor factor in determining the decision of the American government was the fact that the invitation was issued while the conference in Washington was in session, and that it was necessary to send a reply before it could be known what action the Senate might take on the treaties presented.

Signor Facta, Premier of Italy, was chosen president of the conference. Among the leading delegates were Lloyd George, Premier of Great Britain; Louis Barthou, Vice-Premier of France; Dr. Wirth, Chancellor of the German Republic and Dr. Walther Rathenau, Foreign Minister; George Tchitcherin, head of the Russian delegation; Viscount Ishii, head of the Japanese delegation and President of the Council of the League of Nations; and Carlo Schanzer, Italian Foreign Minister and former member of the Conference on the Limitation of Armament.

Three commissions were appointed—Finance, Commercial and Transport. A fourth commission known as Commission No. 1, which took rank over all the others, included a representative from each of the nations present. To this commission were entrusted the peace guarantees and consideration of the first three resolutions of the Cannes Conference, also the problems pertaining to Russia. Each of the other commissions was made up of delegates who were assisted by experts.

Friction between France and Russia developed at the first session, and increased as the sessions continued. However, the diplomacy of Lloyd George and some others prevented the occurrence of an open rupture between these nations.

On the fourth day, the Financial Commission found itself confronted by the financial demands of Russia, whose delegation was trying to inject the question of disarmament into the conference, but this was ruled out because of agreements pre-

ceding the meeting. The Russian demands included (1) a discussion of the relation of English and American money to the money of all other countries, (2) the distribution by long-term non-interest-bearing loans of the gold which America holds, (3) the fixing of the purchasing power of the dollar and the pound sterling, and (4) the flotation of a large international loan to the Soviet government. These demands were referred to a special committee on which Russia was not represented.

The Russo-German Treaty. On April 17 the conference and Europe as well were astounded by the announcement that Russia and Germany had signed a treaty the previous day, entirely unknown to the other powers. While the negotiation of this treaty was somewhat of a shock to the political world, nevertheless it was a possibility to which attention had been repeatedly called by certain farsighted statesmen after the signing of the treaty of Versailles.

Germany and Russia agreed to cancel all war debts and claims for war damages, and damages due to the Soviets' nationalizing German property, provided Russia does not repay other foreign nations for this nationalization. In the latter case Germany maintains the right to claim damages.

Germany and Russia agreed to cancel the Brest-Litovsk treaty. They also agreed to recognize each other, to establish full peace and resume full diplomatic relations immediately. Full reciprocity is to be maintained in the future and the nations agree to treat each other as most favored nations.

The treaty binds together two nations whose territory extends from the Pacific Ocean to the Rhine, and combines a population of over 200,000,000. In this combination there is great potential power.

Non-Aggressive Pact. From the outset, Lloyd George had in mind as the crowning achievement of the Conference the conclusion of a non-aggressive agreement for ten years, modeled on the Four Power Treaty of the Washington Conference. He expected that such an agreement would bind the thirty-two nations of Europe to refrain from aggression for the period stated. If such an agreement could be formed ,it would lead directly to the reduction of land armaments throughout the continent. But the agreement as proposed had little to recommend it, because it did not contain clauses providing for the combined opposition of the signatory nations to any nation who should violate the agreement and take up arms against its neighbor. For instance, should Russia, which is more or less hostile to Rumania for her possession of Bessarabia decide to recover this territory by force of arms, the agreement would not require any nations to assist Rumania in repelling such an invasion. Or should Germany refuse payment of the reparations as already agreed upon, France would be left alone to secure such payment as best she might. These and other similar objections prevented the signing of the non-aggressive pact. Before the adjournment of the Conference, however, Lloyd George succeeded in securing a non-aggressive agreement to continue for eight months or until after the Conference at the Hague.

Conclusion. The Conference closed on May 19, 1922, after six weeks' study of international affairs. The chief results were as follows:

1. Approved plans for a meeting at The Hague in June to study the Russian problem and make recommendations regarding the possibilities of a loan to Russia, and eventual recognition.
2. Arranged for an eight months' truce between Russia and the other powers represented at the conference.
3. Laid the groundwork for future representations of the United States regarding American participation in reconstruction of eastern Europe.
4. Opened up direct negotiations between the Allies (as a group) and Russia regarding private property rights in Russia; debt recognition; commercial concessions; treaties between Russia and other states, and foreign credits for Russia.
5. Paved the way for Lloyd George to propose a ten-year European truce in Europe (similar to the pacific pact drawn up at Washington) at some later date.

Genre, zhon'r, in art, a term used to characterize paintings of everyday life. The

subject of a genre painting is usually some cottage, village, or rural scene. Genre painting is not particularly modern. Pliny tells of a Grecian painter who won note during the reign of Alexander the Great by painting barbers, shoemakers, and the like at their work. Rembrandt in the Netherlands, Murillo in Spain, and Hogarth in London, were leaders of schools of painters that chose homely, everyday scenes. Of later artists noted for genre painting, Millais and Millet may be named. The reader should avoid the notion that genre paintings are inferior. Burns and Whittier chose everyday topics, but they are not humble poets. So, in the painter's art, genius glorifies the commonplace. See MILLET; BRETON.

Gentian, jĕn′shan, an autumn flower. The common European gentian appears to be a prosaic yellow flowered herb in the meadows of the Alps and Pyrenees. Its roots, somewhat like those of the horseradish in length and size, are gathered by the peasants and sold to the drug trade to flavor bitters. Some of the rarer alpine species are blue; but the fringed gentian of America, with its angled and twisted corolla, is the flower of the poets.

> Thou blossom bright with autumn dew,
> And colored with the heaven's own blue,
> That openest when the quiet light
> Succeeds the keen and frosty night;
> Thou waitest late and com'st alone,
> When woods are bare and birds are flown,
> And frosts and shortening days portend
> The aged year is near the end.
>
> —Bryant, *The Fringed Gentian.*

Gentiles, in Scripture, all the nations of the world, excepting the Jews. In the Old Testament it is the rendering of the Hebrew word "goim," signifying a nation, a people. At first it was used as a mere ethnological word, but as the Jews became more conscious of their privileges, it was sometimes used scornfully in speaking of non-Jewish nations. In modern times Gentiles has come to have a broader meaning, especially as used by the Mormons who apply it to other Christian denominations.

Genus (pl. **Genera**), in natural history or biology, a class or kind of either animals or plants. To avoid ambiguity and confusion Latin names are given to genera. Fly, for instance, is applied to so many insects that no one could tell quite what particular insect is meant when we say, "there are flies in the ointment." A number of the more common flies form a genus, to which the name *musca* has been given. To distinguish the common housefly from the other flies of the genus, it is called *musca domestica,* the latter word being the name of the species. American bellflower is an ambiguous name. It may denote an apple or any one of two or three wild flowers. *Campanula rotundifolia,* however, is a particular, delicate bellflower or harebell the world over. The horse, the ass, the zebra, and the quagga belong to the same genus; each belongs to a distinct species. There are about 60,000 genera, averaging five species each, in the animal kingdom. There are about 9,000 genera of flowering plants, including possibly 100,000 species.

Geoffrey of Monmouth, an English chronicler. He was born probably at Monmouth about 1100 and died about 1154. He entered the society of Benedictine monks and was raised later to the bishopric of St. Asaph. He wrote several works, the most important of which, *Historia Regum Britanniae,* is a history of the kings of Britain. The work is chiefly a translation of early manuscripts, and is legendary rather than historical. It gives what claims to be a genealogy of British kings from the time of Brutus, the Trojan, down to 688. Geoffrey's work is of no historical value, but it has preserved the traditions of King Arthur and his knights, the story of Sabrina, the story of King Lear, and many other legends.

Geography, a description of the earth's surface. The position of the earth in the universe and its relation to the other heavenly bodies fall within the province of astronomy. The make-up of the earth and its history before it became fit for the habitation of man belong to geology. The study of the surface, particularly the study of the earth as a home, constitutes the subject of geography. Indeed, Arnold Guyot, the eminent geographer, named his monumental work *Earth and Man.*

The ancients were acquainted with but a small portion of the earth's surface. To Strabo, a learned Greek, resident in Rome, we owe a geographical work in seventeen

books, virtually a geographical cyclopedia, in which the world's knowledge of geography at the time of the birth of Christ is given in systematic form. In Strabo's geography the size and shape of the earth are given correctly, but the land mass is confined to the Mediterranean countries and southern Asia as far as the mouth of the Ganges. Around this territory, which on maps has somewhat the form of an oval about twice as long as it is wide, lay the all encircling ocean into which not only the Mediterranean and the Red Sea, but the Caspian as well, are represented as opening. What to the ancients seemed vast regions of this single small land mass are denoted on maps of that time as inhabited by Hyperboreans and other little known or imaginary people beyond the pale of civilization.

The enlargement of geographical knowledge has been brought about in various ways. One of the earliest, most persistent, and effective motives is the search for wealth, the love of gainful trade. Far back in the mythological age the Greek Jason and his companions are reputed to have sailed eastward in search of the Golden Fleece. The Phoenecians are known to have visited Cornwall in search of tin, and are believed to have bartered for amber on the shores of the Baltic. Motives of conquest and commercial supremacy led Alexander to penetrate the plains of the Indus. The invention of the compass converted boatmen into sailors. Commercial enterprise led to the discovery of the New World and to the circumnavigation of the globe. Missionaries and merchants share in the honor of contributing to geographical knowledge. The mixed love of adventure, desire for gold, and thirst for glory that led Cortez, Pizarro, and De Soto, shaded off in later times into the spirit of scientific discovery that animated Mungo Park, Cook, Speke, Livingstone, Stanley, Humboldt, and Lewis and Clark. The history of Arctic discovery is a chapter in itself, full of daring adventures and intense sufferings.

The body of geographical knowledge is now so great that it is divided into several subjects. At least four distinct branches are recognized:

1. Mathematical geography. This division includes the form, size, position, and motions of the earth, as well as the entire subject of map, globe, and chart making.

2. Physical geography. Under this head are included land, water, and air. Land masses, bodies of water, currents, winds, moisture, temperature, and, in general, the workings of physical forces belong here.

3. Political geography. This is the ordinary geography of the school, dealing with countries, nations, and the industries by means of which man makes a living.

4. Commercial geography. The study of this branch includes not only the production of articles of commerce, but routes of travel and the trade of the world.

Geology, the science which treats of the history of the earth as shown by the study of its structure. It takes up our planet where astronomy leaves it, though to a certain extent they overlap. The progress of life toward present conditions has been learned mainly by the study of the fossils contained in the rock structures. By this means geologists have divided the earth's history into five eras, subdivided in most instances into periods. These are given below with chief characteristics of each age.

Eras	Periods
Azoic without life	Archean igneous rocks.
Proterozoic beginning life	Algonkian sedimentary rocks.
Paleozoic ancient life	Cambrian invertebrates. Ordovician invertebrates. Silurian invertebrates. Devonian fishes. Carboniferous plants.
Mesozoic middle life	Triassic reptiles. Jurassic bird-reptiles Cretaceous chalk.
Cenozoic recent life	Tertiary mammals. Quaternary man.

Anything more than the briefest characterization of these periods or of those extended subdivisions made by geologists would be out of place in a work of limited scope such as this. Anyone wishing to look into the matter further is referred to more extended treatises.

A matter of interest to all on this subject is that of the age of the earth as calculated from geologic history. There is the widest variation in the estimates, however, ranging all the way from twenty-five million years to several hundred million, the lower figures being less commonly given. Physicists on the other hand, reasoning from the time that must have elapsed since condensation according to the nebular hypothesis and subsequent cooling, have arrived at a maximum of forty million years. The largest figures, deduced from the earth's structure, come as a result of the difficulty in placing a time limit upon the earlier ages. The length of the Azoic time is not easily determined, but geologists are generally agreed that the Proterozoic era is probably as long as all the succeeding ones; also that the Paleozoic is probably several times the Mesozoic, which in turn is several times the Cenozoic. Then with an estimated period of forty thousand years elapsing since the Ice Age, occurring in the Quaternary under the Cenozoic, it is readily seen that the whole life history of the earth is by no means a short one.

Geometry, a branch of mathematics that treats of figures and space. The name is Greek, signifying earth measurement. The science is thought to have grown out of land surveying. It was developed first in Mesopotamia and in Egypt, both regions in which it was necessary to reëstablish boundaries between fields, after the great inundations that occur each year. The Greeks were noted mathematicians. The textbook of plane and solid geometry now used in schools is essentially that written by Euclid, a professor of mathematics in the Greek university of Alexandria, Egypt, who flourished about 300-270 B. C. He taught and wrote in the Greek language. His geometry was divided into thirteen books, which were preceded by definitions and axioms, largely as we have them today.

The study of geometry is of exceptional value in teaching students to think and to speak accurately. In geometry a statement is worthless unless absolutely accurate. The conclusions of geometry are also exceedingly satisfactory. We may say of Nero that he was cruel, and yet later find it necessary to modify our opinion; but the geometrical statement that the three angles of a triangle are together equal to two right angles may be proved beyond question, and is true for all time, of all triangles. One cannot be absolutely certain of the spelling of a word, for custom changes. The chemist must be on the lookout constantly, lest some unexpected circumstance prevent chemical action taking place as expected; but when two straight lines cross each other, the opposite angles formed are always equal. They cannot be otherwise. For this reason geometry is spoken of as an exact study. It is also exceedingly practical. The builder finds that a timber forming a triangle with two other timbers is not only a rigid frame, but the only rigid frame known. Geometry gives the reason; a triangle cannot change its shape without changing the length of at least one side. Geometry also furnishes the only method of constructing an exact right angle, that is, of turning a square corner. The rules of mensuration are supplied by geometry. Without geometry the rules for finding the area of a triangle, a rectangle, or a circle, as well as those for finding the solid contents of spheres and other solids, would be mere guesswork.

See TRIANGLE; EUCLID; PYTHAGORAS; HEXAGON.

George I (1660-1727), elector of Hanover and king of Great Britain. In 1698 he inherited the German electorate of Hanover. On the death of Queen Anne in 1714 he was selected by Parliament for the throne of England and Scotland. Through his mother, Sophia, he was a great grandson of James I. When he ascended the throne of England he was fifty-four years old. He could not speak a word of English and had no desire to become an Englishman. He brought a number of German favorites with him and created a great deal of dissatisfaction.

He was a man of simple, plain manners, however, with natural good sense and ideas of justice that pleased the common people well. As he was not an ambitious man, and was unfamiliar with the language, the government fell naturally into the hands of a body of ministers, now known as the cabinet or ministry. This transfer of power from the king to Parliament and its executive committee had been going on rapidly: the peculiar conditions just referred to hastened it to completion. From that time on, the sovereignty of Great Britain became more of an honorary position than otherwise. The king now exercises far less authority than the president of the United States.

George II (1683-1760), king of Great Britain and elector of Hanover. He ascended the British throne on the death of his father in 1727. Like his father, he thought more of Hanover than he did of his English court. During the early part of his reign the real ruler of England was Walpole, who pursued a vigorous foreign policy. A second rising of the Highlanders took place in 1745 in favor of the Stuart prince, Charles Edward. The French and Indian War, of which we read in our American history, took place during his reign, though peace was not formally declared until 1763, three years after his death. William Pitt was the great Englishman of this later period. George II was considered a man of very ordinary ability, without a liking for literature or science. In money matters he was termed stingy. He was obstinate, quick tempered, and conceited; but, unlike some of the Stuart kings, he was truthful and of respectable character.

George III (1738-1820), king of Great Britain and elector of Hanover. He was the grandson of George II. He ascended the throne in 1760. He was the first of the Hanoverian line who was born in England. He is the King George of whom so much is said in the history of the American Revolution. He appears to have been a shortsighted, stubborn man. He was fond of reading and took an interest in agriculture and useful inventions. He appears to have been impatient because the lines of government had passed from the sovereign into the hands of a cabinet. It is said that he spent large sums of money in bribing influential members of Parliament to do his bidding and to carry out his views, rather than the wishes of his ministers.

The American colonies secured their independence during the reign of George III. This loss of America must not be supposed to have occupied so great a place in public attention or in the mind of the king as Americans are disposed to consider. With large interests in other parts of the world, and a powerful enemy just across the English Channel, George III and his Parliament had many other questions to consider that seemed to them of more importance than the management of a few struggling colonies forty days distant. Nevertheless King George was distressed by the revolt of the American colonies. When, after the peace of 1783, John Adams appeared at the court of St. James as minister of the United States, King George received him kindly and was much affected by Minister Adams' expressions of good will toward the mother country. When the American ambassador addressed him in respectful and affectionate language, his reply was full of feeling.

"Sir," he said, "the circumstances of this audience are so extraordinary, the language you have now held is so extremely proper, and the feelings you have discovered so justly adapted to the occasion, that I must say that I not only receive with pleasure the assurance of the friendly dispositions of the United States, but that I am very glad the choice has fallen upon you to be their minister. I wish you, sir, to believe and that it may be understood in America, that I have done nothing in the late contest but what I thought myself indispensably bound to do by the duty which I owe to my people. I will be very frank with you. I was the last to consent to the separation; but the separation having been made, and having become inevitable, I have always said, as I say now, that I would be the first to meet the friendship of the United States as an independent power. The moment I see such sentiments and language as yours prevail, and a disposition to give to this country the preference, that moment I shall say, let the circumstances of language, religion, and blood have their natural and full effect."

George III was not a great man; he is not a favorite with American readers; but we may well afford some kindly feeling for

our last king. The critical American historian and publicist, Ford, says of him:

> In his private life he exactly fulfilled the popular ideal of a good ruler. In an age when society was recklessly dissolute, he was chaste in conduct, temperate in diet, and simple in manners. While irreligion abounded, he kept a virtuous home, whose days, beginning with family prayer, were passed in laborious performance of duty. But though a good man, George was a bad ruler. His public conduct, at the best, was marked by the narrowness and trickery of a small politician, rather than by the tact and broad outlook of a statesman.

Although it has been stated in some quarters that King George was not fond of literature or art, it is certain that he was a tireless book-collector, and that he fostered the British Museum, leaving to it, in fact, his fine private library. When about to take up a residence at Weymouth he wrote his bookseller, the list is still extant in his own handwriting, to send him a parcel of books including a two-volume Bible, a religious work called *The New Whole Duty of Man, The Annual Register* in 25 volumes, *Blackstone's Commentaries, Johnson's Dictionary,* a French Dictionary, three collections of poems extending to 87 volumes, Shakespeare's plays, histories of England and France, two volumes of Voltaire, the works of Jonathan Swift, and a few other books in English and in French—none in German, none in Latin or Greek, none in science.

See HANOVER; VICTORIA.

George IV (1762-1830), king of Great Britain and Ireland and Hanover. He was the son of George III and Charlotte Sophia, a German princess. He was married without his father's consent to a Mrs. Fitzherbert in 1785, and in 1795 he was married with royal consent to his cousin Caroline of Brunswick. Prince George belonged to a wild set of young men, including Fox and Sheridan, leaders of the Whigs. This is the prince whose partisans caused the arrest and imprisonment for a year of two editors who had the impertinence to say a rival paper had been guilty of exaggeration in calling the Prince of Wales an Adonis. He was rather a handsome man. He dressed in the height of fashion and delighted in the title of "the first gentleman in Europe." The man whose esteem he most desired was "Beau" Brummel, leader of court fashions.

He was made regent in 1811, and succeeded his father in 1820. He refused to permit his queen to take part in the coronation exercises; and sued for divorce. It speaks well for the nation that the suit was not granted, even to a royal successor of Henry VIII. On his accession George forsook his early Whig friends and looked with favor on the Tories. Robert Peel and the Duke of Wellington, a warrior, not a statesman, were the leading Tories.

The reign of George IV is rather an ignoble one. The Tories basked in the reputation won by the successful ending of the Napoleonic wars. War taxes were continued almost to the verge of confiscation. Among the measures to be commended was the enfranchisement of Catholics in 1829, and an overhauling of the penal laws. In 1823 the death penalty was removed from a hundred offenses.

One of the best things that can be said of George IV is that he presented the British Museum with 65,250 volumes, 20,000 pamphlets, and a "superb array" of maps, topographical drawings, and prints. He died without issue, and was succeeded by his brother, William IV.

George V (1865-), King of the United Kingdom of Great Britain and Ireland, was born at Marlborough House. He is the son of Edward VII and Alexandra, the eldest daughter of King Christian IX of Denmark. The heir apparent to the throne, King George's elder brother, died in 1892, leaving George heir apparent.

The Prince received naval training, entering as a cadet when but twelve years of age. In this position he was subjected to the same discipline as were the other cadets. He was raised to a captaincy in 1893; was made rear admiral in 1901; and vice admiral in 1903.

Prince George married Victoria Mary of Teck in 1892. The royal couple have five sons and a daughter; the eldest the Prince of Wales, was born in 1894.

After his father's accession to the throne as Edward VII in 1901, Prince George made a world tour with a view to becoming thoroughly conversant with political,

social and economic conditions in the British colonies. After his return to England he was in close association with his father in the conduct of government affairs. King Edward died in 1910, and Prince George ascended the throne as George V. While on tour, he opened the first Parliament of the Commonwealth of Australia. Upon his return he made a speech at Guildhall, during which he sounded the warning: "England, wake up." His remark referred to conditions as he has seen them in the colonies.

Soon after his accession, King George made a tour of Ireland, Wales and Scotland; and thereafter he and the queen devoted themselves to the pleasant task of making the court a kindly and useful influence in British life. They were eminently successful in continuing the democratic tradition handed down by George's father, King Edward.

The opening of the World War only served to stimulate the king and queen to renewed activity in this direction. Upon every available occasion and by every act possible they set an example of encouragement to the fighting forces and undeviating industry at home. In numerous speeches King George stressed the necessity of everyone's putting himself wholeheartedly into the task of winning the war for the allies. He made personal visits to the nations collieries and munitions centers, bearing always the same message of encouragement.

On December 5, 1914, the king made a visit to the battle front in France, and made similar visits on October 21 to November 1, 1915; August 7 to 15, 1916; July 3 to July 14, 1917; and March 28-30 and August 5-13, 1918. During his visit in 1915, the horse upon which the king rode reared and fell backward; the king narrowly escaped a fatal accident, and was incapacitated for some months.

The royal household actively participated in the general rejoicing that marked the close of the war; and thereafter the life at court returned to normal, King George visited Ireland in 1921 to open the Northern Irish Parliament.

George Eliot. See CROSS, MRS. MARY ANN EVANS.

George, Henry (1839-1897), an American writer and economist. He was a native of Philadelphia. He went to sea when a boy and brought up in California, where he learned the printer's trade, and became a reporter on the San Francisco *Times*. In 1867 he became its editor. He conceived the notion that, under our system of paying wages, the workingman does not receive his full proportion. As opposed to the capitalist, he enunciated a doctrine, since somewhat hackneyed, "I am for men." He opposed the present system of taxation, claiming that it would be more just to levy a single tax on land values only. He wrote a number of works. His views are set forth fully in *Progress and Poverty*. In 1880 he went to England and later took up his residence in New York City. In 1886 he was nominated by the labor party for mayor, and received the very respectable number of 67,000 votes. Not discouraged by defeat, he was nominated again in 1897, but the excitement of the campaign proved too much for him. He died before the day of election. See TAXATION.

George Junior Republic, The, a system of helping neglected boys and girls, modeled upon the republic of the United States. In 1890 Mr. William Reuben George of New York took a party of boys to the country with him for a summer outing. Everything was done for them. Plans were made for their daily entertainment and they went home loaded with fruit, vegetables, clothing, and toys. Mr. George did this for several years. Then he realized that instead of helping the boys his kindness really hurt them; they cared more for what they got than anything else; they stole the farmers' apples; they laughed at any punishment he gave them. Suddenly Mr. George had an idea. It was that charity which does not ask work in return is pauperizing and degrading to self-respect. He discontinued his free charity, and in its place gradually built up a most unusual institution. Today at Freeville, New York, there is a junior republic filled with citizens from sixteen to eighteen years of age, girls as well as boys. Here every citizen earns his living. There is a bank for handling

the aluminum money used there, a post-office, a general store, a cooky factory, a laundry, a tile factory, a hotel, a printing office,—in short, every kind of establishment one might look for in the ordinary village, including a court and a jail. Each of these business houses has an adult manager; the citizens employed by him do all of the work. The community is self-governing. The boys make their own laws at "town meetings" and elect a president and other officers to enforce them. The youthful citizens have shown themselves very just and wise in the treatment of offenders against the law. Formerly Mr. George was president, but as the community became able to govern itself he withdrew, keeping the power of veto.

The citizens come from every class of homes. Some of them are "toughs," so-called, from the city streets; others are the children of millionaires sent there from expensive private schools in the hope that they will amount to something in the republic; still others are boys and girls who come from choice to learn how to make their way in the world. When a citizen's term of residence is up, his aluminum money is exchanged for United States coin, and he goes out into the world ready for citizenship.

There is now a National Association of Junior Republics. Branch societies in different states have established other Junior Republics, and Mr. George's plan is meeting with the success it deserves.

George, Saint, a Christian martyr who was put to death at Nicomedia in 303. The history of St. George is obscure, his existence even having been called in question. It is beyond reasonable doubt, however, that he lived and was put to death for his faith during Diocletian's persecution. He was venerated by the eastern church, and in the fourteenth century, under Edward III, was adopted as the patron saint of England. Many legends are told of Saint George. The best known is of his contest with a dragon. A ballad recounting this adventure is given in Percy's *Reliques*. The dragon in the story is supposed to represent the devil; and Sabra, the king's daughter, whom he rescues from the dragon, represents the church. The twenty-third of April, the date of martyrdom, is called St. George's day. It was at one time the day when new leases and contracts were made. A celebrated painting of St. George and the dragon is preserved in the Hermitage Museum at Petrograd. The saint is represented in armor and mounted on a white horse. He is charging the dragon, which, apparently turning to flee, is transfixed by George's spear.

George Sand. See SAND, GEORGE.

Georgetown University, an institute for higher education under the auspices of the Roman Catholic Church, is located at Washington, D. C. The university maintains a college, a graduate school, schools of law, medicine, dentistry, foreign service, and an astronomical and seismic observatory. The faculty numbers over 200 and the enrollment is about 6,000.

George Washington University, a school for higher education situated at Washington, D. C. It is the successor of Columbian College of the District of Columbia, which was chartered by Congress in 1821. Later the name was changed to the Columbian University and in 1904 by act of Congress to George Washington University. It maintains the college of arts and sciences, Columbian College (for undergraduates) a graduate school, college of engineering, teachers' college and departments of law and medicine. There are over 280 members on the faculty, and the enrollment is approximately 6,000.

Georgia, one of the thirteen original states. It borders on the Atlantic. It touches both Carolinas, Florida, Alabama, and Tennessee. The total area is given at 59,475 square miles. Georgia is the largest state east of the Mississippi River. A line carried from the Atlantic Ocean directly northwestward rises gradually from sea level to the top of the Blue Ridge. The highest summit in the state is known as Enotah, commonly called "Bearstown Bald." It is 5,046 feet above the sea.

TOPOGRAPHY AND CLIMATE. The drainage of the state is three-fold. The Savannah, the Altamaha, and other rivers drain the eastern half into the Atlantic

Ocean. The Suwannee, the Flint, the Chattahoochee, the Coosa, and their tributaries carry the waters of the western part to the Gulf. The waters of the northwestern corner beyond the Blue Ridge escape through the Tennessee to the Mississippi River drainage system. The climate is essentially that of the Gulf States. Snow seldom falls on the Atlantic coast. The Blue Ridge region has winters resembling those of Tennessee. The annual rainfall varies in different parts of the state. It may be put at from forty to seventy inches a year. About two-thirds of the amount falls in winter. It is only 300 miles from the northern to the southern boundary, but a difference in altitude gives the state a great variety of climate and of productions.

Soils, Etc. There are four distinct physical regions. The tidewater region extending along the coast and including a number of islands off shore has an alluvial soil of wonderful fertility. Both vegetation and productions are sub-tropical. As in Florida, occasional frosts do great damage. The fig, lemon, orange, banana, cabbage palm, and blue palmetto grow here. This is the home of the celebrated Sea-island cotton, and naval stores of all kinds are produced in abundance. Where facilities for shipment are at hand, as near Savannah and other ports, market gardening is carried on. Early potatoes, strawberries, cabbage, barley, tomatoes, onions, and peas are shipped to northern cities.

Next within this strip and occupying a belt about 160 miles in width, comes the pine and melon belt. It is also known as the wire grass region. The soil is sandy. It is especially adapted to cotton, corn, the melon and the pear. The state leads the Union in the production of watermelons. Japan plums, figs, blackberries, sweet potatoes, and the Georgia yam grow to perfection in this belt. This section is noted for the production of peaches. The famous Elberta peach, the choicest variety known for shipping purposes, originated in one of these localities. Still farther northwestward comes the third region. It is known among horticulturists as the peach and grape belt, though cotton and corn are the leading crops. The soil is chiefly a red clay. Enormous quantities of peaches are raised here for the northern market, and strawberries and raspberries do well. The fourth region, that of the Blue Ridge, known locally as the Tennessee Dip, is noted for the production of grain, apples and cherries.

Agriculture. Agriculture is the leading occupation. Since 1914 the ravages of the boll weevil have given a strong impulse to diversified farming. The islands off the coast and lowlands in the southeastern part of the state have always been noted for the production of long staple or sea island cotton but in recent years the production of cotton has fallen off and the production of cereals and fruit has increased. In 1921 the production of cotton was 787,084 bales, giving Georgia fourth place among the cotton producing states. Corn is the most important cereal crop, followed by oats and wheat. Other important crops include peanuts, sweet potatoes, Irish potatoes, tobacco, sorghum and sugar cane. Georgia is an important fruit state and ranks next to California in the production of peaches. Oranges, lemons and other semi-tropical fruits are grown to a small extent in the southern part of the state. This region also produces large quantities of garden vegetables and peanuts. Many of the counties afford excellent pasturage and in these regions stock raising is an important branch of agriculture.

Forests. The sandy region was originally covered with long-leaf pine, forests of which still yield large quantities of turpentine and rosin. The Georgia pine found in the southern part is the most important tree in the state. Forests of oak, poplar, beech, chestnut, hickory, maple and walnut are found in the red clay region, and the sycamore, gum, dogwood and persimmon grow in the river bottoms.

Minerals. The state has a limited supply of coal, and some gold is found, but the most valuable minerals are clay suitable for making bricks, tile, sewer pipes and terra cotta, and building stone, especially marble; that found in the northwestern part of the state being the purest and whitest found in the United States.

MANUFACTURES. The streams furnish abundant waterpower and the cities along the fall line—Augusta, Macon and Columbus—have the advantage of water power for manufacturing purposes and navigable rivers for transportation. Since 1910 the manufacturing interests of Georgia have increased rapidly. The manufacture of cotton goods is of first importance and that of lumber and lumber products ranks second. There are iron works in the northwest and the manufacture of woolen goods and the production of flour and other gristmill products are growing industries.

TRANSPORTATION. The numerous rivers afford water transportation, but they are not as much used as formerly, owing to the railway facilities now available. In 1923 Georgia had over 9,600 miles of steam railways. The Central of Georgia, the Southern Railway, the Seaboard Air Line and the Atlantic Coast Line are the leading roads in the state. Atlanta, Savannah, Augusta, Macon, Columbus and Waycross are important railway centers. The Dixie Highway, the leading north and south automobile route, extends through the state.

POPULATION...The population in 1920 was 2,895,832 as against 2,609,121 in 1910, an increase of 11 per cent. Forty-one per cent of the population is colored but the population of Negroes decreased from 45.1 per cent of the total population in 1910 to 41.7 per cent in 1920. The density of population in 1920 was 49.3 per square mile as against 44.4 in 1910.

EDUCATION. The University of Georgia at Athens is at the head of the educational system. This is the oldest state university in the United States, having been chartered in 1785. The Franklin College of Liberal Arts, the Agricultural and Mechanic College, the law school, the state normal school and the graduate school are located at Athens, and there are a number of affiliated colleges located in different parts of the state. The largest of these is Georgia Tech. at Atlanta. These are supplemented by numerous schools for white and colored students under the auspices of different religious denominations. Between 1910 and 1920 the enrollment in the public schools increased 50 per cent, and the amount expended for public education in 1920 was three times that spent in 1910.

GOVERNMENT. The present constitution was adopted in 1877. There are one hundred sixty-two counties. The legislature consists of a senate of 52 members and a house of representatives of not more than 205 members, the members being chosen for two years. The legislature meets once in two years and the sessions are limited to fifty days. The governor, comptroller-general, secretary of state and treasurer are elected by the people. The governor's term is two years and he is ineligible for re-election for four years after holding office for two consecutive terms. The courts consist of a supreme court comprising a chief justice and five associates chosen for six years by popular vote, an appellate court and superior courts in each judicial district. The judges of these courts are elected by the people for four years.

HISTORY. De Soto entered the region in 1540 on his way from Florida to the Mississippi. Georgia was a part of the Carolina grant but when the Carolinas were made royal provinces the territory of the state was granted by patent to twenty-one trustees. The first settlement was made in 1733 at Savannah by a company led by James Oglethorpe. During the first ten years the colony prospered. Then Oglethorpe returned to England. The rule of his successors was unfortunate and the colony rapidly declined. During this period traffic in rum and slaves was introduced. In 1752 Georgia became a royal province. Georgia took an active part in the Revolutionary War, and was among the first states to ratify the Federal constitution.

Notwithstanding the strong hold of slavery upon the commercial interests of the state, a strong faction under the leadership of Alexander H. Stephens opposed secession; however the state seceded in January 1861. Commerce and industry were practically ruined during the war and in the years immediately following Georgia suffered a serious commercial depression. Owing to differences between the state legislature and Congress, the state was not readmitted until July 15, 1870.

Georgia has regained her former pros-

perity and is justly entitled to the popular name "Empire State of the South." In 1906 liberal appropriations were granted for establishing agricultural schools. Other important legislation between 1910 and 1922 included establishing a State Board of Health (1914); provision for registration of births and deaths; provision for establishing juvenile courts; prohibition of the employment of children under fourteen years of age; establishing a State Board of Vocational Education; establishing a community service commission (1919) and the passage of an Employers' Liability Act (1920).

STATISTICS. The following are the latest reliable statistics available:

Land area, square miles	58,725
Water area, square miles	540
Forest area, acres	21,000,000
Population (1920)	2,895,832
White	1,689,467
Negro	1,206,365
Chief cities::	
Atlanta	200,616
Savannah	83,252
Macon	52,995
Augusta	52,548
Columbus	31,125
Number of counties	155
Members of state senate	51
Members of house of representatives	193
Salary of Governor	$7,500
Representatives in Congress	6
Assessed valuation of property	$1,079,236,826
Bonded indebtedness	$5,818,202
Farm area, acres	25,437,072
Improved land, acres	13,054,010
Corn, bushels	69,975,000
Wheat, bushels	1,449,000
Oats, bushels	8,652,000
Rice, bushels	78,000
Tobacco, pounds	7,896,000
Sweet potatoes, bushels	12,410,000
Cotton, bales (500 lbs.)	787,084
Wool clip pounds	418,000
Domestic Animals:	
Horses	132,000
Mules	347,000
Milk cows	470,000
Other cattle	763,000
Sheep	119,000
Swine	3,102,000
Manufacturing establishments	4,803
Capital invested	$ 488,700,194
Raw material used	$ 140,490,057
Operatives	123,441
Output of manufactures	$ 693,237,096
Miles of railway	9,650
Teachers in public schools	17,908
Pupils enrolled	770,937

Geranium, an herbaceous flowering plant of both hemispheres. There are over 150 species. The common American woodland geranium is also called crane's-bill from the long, tapering seed pod. The oxalis, or wood sorrel, and the touch-me-not belong to the geranium family. The familiar house plants known as geraniums are closely related, but are really pelargoniums, the distinction being that the flower of the house plant is slightly one-sided, one of the petals having a spur or honey tube running down the flower stalk. Potted geranium may be put into four divisions:

a. Rose geraniums with scented leaves.
b. Lady Washington or show geraniums.
c. Ivy geraniums with thick, shiny, angled leaves and two-lipped flowers,—a basket plant.
d. Ordinary geraniums with zone-marked leaves.

Geraniums are propagated best by slips. Take about three inches of the end of a branch, break off the large leaves, and insert half its length in fine earth. Water thoroughly once in a while. Do not keep a geranium water-soaked.

Gerard, James Watson (1867-), an American diplomat who represented his country in Germany during the trying days before America's entrance into the World War, was born at Geneseo, N. Y. In 1890 he was graduated from Columbia University and in 1892 from the New York Law School. Mr. Gerard was admitted to the bar in 1892 and began practice in New York City. He was associate justice of the New York Supreme Court from 1908 to 1911. In 1913 he was appointed ambassador to Germany. From this time until diplomatic relations between Germany and the United States were severed, Mr. Gerard used all his skill and tactfulness to assist the two nations to come to an agreement. He was recalled in 1917. He was a Democratic nominee for the United States Senate in 1914. Mr. Gerard is the author of *My Four Years in Germany* and *Face to Face with Kaiserism.*

Gerin-Lajoie, Antoine (1824-1882), a Canadian novelist and poet, noted as the author of *Jean Rivard,* a French-Canadian classic. He was born at Yamachiche, Que-

bec, and educated at Nicolet Seminary. He was admitted to the bar in 1848, but before this time he had already been connected with *La Minerve*, a Montreal journal. M. Gerin-Lajoie was one of the founders, and for some years president of L'Institut Canadien. Besides *Jean Rivard*, his masterpiece, he wrote *Le Jeune Latour;* and *Ten Years of Canadian History*, a lucid study of the period in which responsible government was established.

Germ, that which germinates or grows. In medical science the term is used to mean a minute plant or animal, or a spore of the same. According to the germ theory, a large number of diseases, practically all contagious, are due to the poisonous influence of colonies of these organisms. A plant of this sort is a bacterium, plural, bacteria. An animal is a protozoön, plural, protozoa. Yellow fever and smallpox are, it is well believed, caused in this way; the former by a plant, the latter by animal colonies. A disease of this sort can be acquired only by taking germs into the system. Yellow fever or smallpox without germs are as impossible as a yield of wheat or chickens without seed or eggs. It has long been customary to speak of sowing the seeds of death and disease. The discovery of the actual germs of illness gives added force to the expression.

A careful farmer aims to keep foul seeds out of his fields. Preventive medicine, represented by boards of health and health officers, aims to keep the germs of disease out of the human system. Any agency that kills germs is a germicide. All germs are killed by heat. Some are killed by light, a few are ended by freezing, others live in ice. X-rays, radium, and electricity check, and possibly kill, certain microbes. Among chemical agencies that kill germs of one kind or another, chloride of lime, carbolic acid, alcohol, ammonia, formaldehyde, creosote, iodine, mercury, oils, mustard, cinnamon, peppermint, pennyroyal, quinine, borax, and salt may be named.

Under VACCINATION an account is given of the way in which the serum of the blood may be fortified against the germs of smallpox. The presence of weak germs seems to fill the blood with an antigerm element which prevents the future growth of germs of that sort. If soil be saturated with certain substances, as kerosene, seeds planted in it will decay instead of sprouting. It is possible, in the same way, to impregnate the blood with such an element that the germs of a specific disease will die instead of multiplying. This process is called inoculation. It consists in giving a person a mild form of the disease.

See BACTERIUM; VACCINATION; DISINFECTANT; GERMICIDE.

German. See LANGUAGE.

German East Africa. See KENYA COLONY; TANGANYIKA TERRITORY.

German Southwest Africa. See UNION OF SOUTH AFRICA.

Germany, Republic of, a state of central Europe, formerly the German Empire, adopted the republican form of government in 1918 following the defeat of the German armies by the allies and the abdication of the Emperor. The present Germany has an area of 185,890 square miles. It is bounded on the north by the North Sea, Denmark and the Baltic Sea; on the east by Poland, Czechoslovakia and Austria; on the south by Czechoslovakia, Austria and Switzerland; and on the west by France, Luxemberg, Belgium, Holland and the North Sea.

THE PEOPLE. The inhabitants of Germany belong, broadly, to that great division of the human race known as the Aryan division, which embraces almost all Europeans as well as peoples who live and have always lived in Asia; but more narrowly, they are members of that western branch of the Aryan division known as Teutonic. Also to this branch belong the people of Scandinavia, the English, the Dutch, and the bulk of the people who inhabit Australia, Canada and the United States. Physically, whether short or tall, the Germans are characterized by a marked stockiness of body, which makes for great strength rather than for agility. They are predominantly blonde, as are the other Teutons.

The Germans, temperamentally, differ from that of their great neighbors to the south, the French, in that they have less vivacity than the French, less physical and mental animation, but more thoroughness.

The Germans are a meticulous people, a people who, taking up a task, carry it through to completion not only as a whole but in the last detail. They have as much determination as have the English, but have somewhat less verve, giving rise to the almost proverbial stolidity that is always cited as the chief German characteristic.

Formerly, there were peoples comprised in the German Empire whose native language was not German, but the greater part of these, with the territories they occupied, have been allocated, since the World War, to their native countries. The two broad divisions within the German language are Low German (Plattdeutsch) and High German. The former is the language, or dialect, of northern or lowland Germany, while the latter is spoken in central and southern or highland Germany. But this is not to say that there are no other dialects or that intercommunication of ideas in any part of Germany is difficult.

This country, relatively to its area, is very densely populated. In the last official census year the average density was 318 to a square mile, while in the United States it was only 35.5 to a square mile. The greatest density is in the state of Hamburg, which averages 6,564 to a square mile.

Germany is predominantly Protestant, though Catholics outnumber the Protestants in some of the states. The new German constitution provides for full religious freedom and for full social equality among all religious sects or denominations, and there is no state church.

Surface and Drainage. The surface of the country is divided into lowland and highland. The great plain that begins in Siberia at the Behring Sea and crosses Asia, continues across northern Europe and so embraces the northern third of Germany. This part of the country slopes north and northwestward toward the North and Baltic seas. Here the land ends in low, damp and sandy plains from which rise occasional sand dunes. This is the most unproductive part of the state; it is the field over which in a past ice age sand and rubble were widely strewn before the ice receded.

Central and southern Germany, High Germany, is in greater or less degree mountainous, but is itself subdivided into two geographic areas—the Alpine and the more gently broken areas. The Alpine region is in and sharply confined to the extreme southeast. The highest peak in this region is the Zug Spitze, in Bavaria, 9,725 feet high. North and west of this region there are few elevations that exceed 3,500 feet. Here are many broad upland plains, separated by numerous mountain ridges and masses, almost all of which are marked by a roundness of crest unknown to the Alps. The Vosges, the Erzgebirge, the Harz Mountains, the Schwarzwald (Black Forest) and the Giant Mountains are the most important ranges or groups. There can be little doubt that the natural barriers presented by these mountains served to keep the people of Germany apart and grouped in separate states for many centuries.

The most important river of Germany—the river of story and the river of commerce—is the Rhine. It is the one river than links together the three topographic regions described above. All the rivers, excepting the Danube, which flows eastward, belong to the North Sea and Baltic basins. The Elbe, navigable throughout its entire course in Germany, is next in importance. It passes through mining, manufacturing and agricultural districts and binds Berlin, the capital, to Hamburg, the chief port, by means of numerous canals. The principal rivers flowing into the Baltic Sea are the Vistula and the Oder. These rise in Austria and flow mainly through lowland Germany. The Elbe and the Weser flow into the North Sea; the Rhine passes into the Netherlands to the North Sea; the Ems also flows into this sea. The Danube flows eastward out of Germany to the Black Sea. The Main, Saale and Moselle are the most important tributary rivers.

The lakes of Germany, about 700 in number, are situated in two regions, the Alpine and the lowland east of the Elbe. The clear, pure Alpine lakes are rock basins formed by glacial action. The lakes to the north are more numerous,

but have neither the purity nor the beauty of those in the south.

CLIMATE. Germany has a generally equable climate. The south is cool by reason of its height, while the lowland north is benefited by proximity to the sea. From north to south the average climate varies from 48° to 52°. From east to west greater differences are noticed. The climate of the east is more continental, marked by extremely hot summers and cold winters, while in the west extremes of heat or cold are absent.

In the Harz Mountains, which cause precipitation from the water-laden clouds coming in from the North Sea, the rainfall is greatest, averaging 40 inches a year; for the greater part of central and and north Germany the annual rainfall is from 20 to 30 inches.

MINERALS. Though a great part of her mineral-bearing territory has been taken from her, Germany is still rich in minerals. The iron mines of Alsace-Lorraine have gone to France and all products of the Saar Basin go to the allies for fifteen years following the Treaty of Versailles. Coal is still produced, however, in Saxony, Lower Silesia and near Hanover, and brown coal is mined along both banks of the Elbe and on the lower Rhine. Graphite is produced in Bavaria; asphalt in Prussia; petroleum in the Hanover district, between the Teutoberg Forest and the Weser Mountains; iron is found in abundance in many parts of the state; lead and zinc are mined in upper Silesia; copper comes chiefly from the Harz mountains; and the principal salt mines are in Saxony and Anhalt.

AGRICULTURE. Germany lost approximately 14 per cent of her arable land and 24 per cent of her vineyards after the War; about 80 per cent of the remaining land is under cultivation. Large farms such as are found in Canada and the United States are unknown. The soil for the most part is not naturally highly productive, but the German farmer has fertilized and tilled it until it yields richly. Cereals, hay and potatoes are the principal crops, followed by flax, sugar beets and hops. Rye is the most important cereal. Government aid has been extended to agriculturists for many years, and the same scientific methods are applied to this industry as are applied to manufacture. Still, Germany is not agriculturally self sustaining, due to the difference between area and population. Stock raising is a very important branch of German agriculture.

FORESTS. The country has 30,000,000 acres of forests, and the greater part of these are very carefully tended. Central and south Germany are the most heavily forested. Two-thirds of the woods are coniferous, with pine predominating; while in the remaining one-third, beeches are most numerous.

MANUFACTURE. Germany is predominantly a manufacturing state. Of late years the German production of heavy machinery, metal ware, textiles and chemicals has increased enormously, and though the figures for 1913 and 1920 show a marked decrease in these products in the latter year, Germany's place in the world's markets is still important. Germany makes a high quality of cast iron machine parts, iron bridges, wire of every kind, locomotive and traction engine boilers, ornamental cast ware, scales, wire cordage, railway axles, wheels, spokes and rails and much other metal ware. There has been a marked decrease in these owing to the loss of the Alsatian iron mines.

TRANSPORTATION. As is to be expected of a highly industrialized country, Germany has excellent transportation facilities. Many of the rivers are navigable for hundreds of miles, the total length of navigable rivers being 6,000 miles. Canalization has greatly aided transport by water. The total length of canals is upward of 1,500 miles, and the ports and industrial centers are bound together by 35,919 miles of railroads.

EDUCATION. No country in the world has given more thought and money to the spread of knowledge than has Germany. The few illiterates in Germany are chiefly foreigners resident in the country. Primary education is free and is compulsory between the ages of six and fourteen. The entire educational system is divided into

general schools, technical schools, technical colleges and universities. The elementary or "folk" schools had an enrollment in excess of 10,000,000 at the time of the last German school census. The gymnasium is the secondary school in Germany; there were 563 gymnasia when the last census was taken. In the secondary class, however, there are also schools that give special instruction in mathematics, modern languages, Latin and science. In 1921 Germany had 11 technical colleges, 7 lycées, 4 agricultural colleges, 3 academies of forestry, 3 veterinary colleges, 4 commercial colleges, 2 academies of mining, 11 colleges of music and 23 universities.

Of the latter, the University of Wurzburg, founded in 1402, is the oldest; the University of Berlin is the largest; the University of Rogstock is the smallest; and the most famous are those of Berlin, Freiburg, Munich, Leipzig, Heidelberg, Halle, Jena and Bonn. From all over the world students have gone to these institutions, and their fame has spread to all corners of the earth.

History. The history of the German people begins about 113 B. C., when the Teutonic tribes (Teutones) decisively defeated a force of invading Romans under Papirius; but their carefully chronicled history does not begin until 843 A. D. In this year, by the Treaty of Verdun, the empire of Charles the Great (Charlemagne) was divided among his three grandsons. To Louis went the eastern part of the empire, a part of which became the present Germany. The French and Germans had been united under Charlemagne, but from 843 onward they were definitely separated.

From this time onward Germany was very frequently at war. The Moravians and Hungarians (Magyars) were the strongest of the early enemies, and between these and the Germans there was hostility and war until the reins of power passed into the hands of Henry the Fowler, of Saxony. Previously, Germany was a loose federation of duchies each of whose rulers possessed great power and was constantly making trouble for the king. Henry curbed these rebellious underlings to such an extent that under him the German Empire really began.

Henry was succeeded in 936 by Otto I. Otto succeeded in holding the empire together, and it was he who punished the Magyars so severely that they never again encroached upon German territory. Otto also further curtailed the power of the nobility; he conquered Lombardy, and in 962 was given by the Pope the title of Emperor of the Holy Roman Empire.

One of the strongest of Otto's successors was Henry II, who, unlike his predecessors, gave little attention to the conquest of Italy, being more concerned for a united Germany. His son, Henry III was also an able ruler who still further unified the empire. Frederick I, or Frederick Barbarossa (1152-90), was one of the greatest of Charlemagne's successors. In his reign the states of Germany were brought into closer harmony than had ever obtained before. He was one of the noted Hohenstaufen line of rulers.

From the death of the last Hohenstaufen until the accession of Charles V in 1519, Germany went through many periods of anarchy. Charles' predecessor and grandfather, Maximilian I, succeeded in bringing a degree of order out of chaos, and Charles ruled until 1556 over Germany, the Netherlands, Spain and Naples. But his empire fell apart like many that had preceded it. Luther sounded the note that began the war between Protestant and Catholic (See Luther, Martin) which, after several brief periods of comparative quiet, culminated in the great conflict known as the Thirty Years' War (which see).

After the close of this struggle one of the German states, Prussia, stood above the others in political and economic power. The Elector Frederick assumed the title of King of Prussia in 1701 thus taking rank with the other European monarchs. His son, Frederick the Great, invaded Silesia, which belonged to Austria. Austria was ruled by Maria Theresa; she sent her armies against the invaders, but they were defeated in what is known as the War of the Austrian Succession, which

lasted eight years. Frederick built a powerful Prussian army. Maria Theresa, with the aid of France, Sweden, some of the other Germanic states and Russia, prepared to wrest Silesia from Frederick; he, however, marched into Saxony before his Austrian enemy had time to act, and the Seven Years' War followed. At the close of the war Prussia was as strong as Austria, and the foundation of modern Germany was laid.

The Napoleonic wars exerted a profoundly disturbing influence on the states of central Europe; having the final effect of drawing them closer together, though it had been Napoleon's plan to separate and thus weaken them. The Germanic states, after the Congress of Vienna, were unified, with Austria at their head. But the union contained the seeds of its own undoing, in that Prussia and Austria could not be reconciled. Also, the states had been promised separate constitutions, and when these were not forthcoming a clamor for constitutional government began. A customs union of the states was formed in 1830, and the agitation for constitutional government was reinforced by a growing nationalistic feeling.

William I came to the Prussian throne in 1861, and with the aid of Bismark, he formed a stronger Germany, a Germany strong enough to dictate to Austria and welcome the war with France that was made inevitable by the rising power of the Hohenzollerns. (See BISMARCK). Germany defeated France, taking back the provinces of Alsace and Lorraine, which had been siezed by Louis XIV. In 1871 William's confederation was converted into an empire with himself at its head as Emperor William I.

When William II came to power in 1888, Bismarck found himself out of favor and was forced to resign two years later. William II wanted neither direction nor advice; his desire was to exercise all the power allowed him. He further extended Germany's miltary and naval power until he had completed one of the most perfect military machines the world has ever seen. The other nations of Europe, notably France and England, were doing likewise, and the ground was laid for the Great War. The immediate cause of that struggle was the assassination of Francis Ferdinand, Archduke of Austria, by a Servian in June, 1914. (See WAR, THE GREAT.)

When the war was closed, William II was forced to abdicate. Immediately after this event the new chancellor, Friedrich Ebert, took charge of the internal affairs of Germany. On November 12, 1918, he issued a manifesto saying he was about to form a new government which would be a government of the people and would enable him to secure peace, save the country from civil war and famine and consolidate the liberty so lately won from autocracy. The Majority Socialist party, with Ebert in charge, vested temporary governmental authority in the Council of the People's Commissioners. The same day, November 12, it issued a series of proclamations and appeals. The first announced the government to be socialistic, proclaimed freedom of speech, liberty of religious observance, political amnesty, removal of censorship, etc. It promised many reforms and concluded with the declaration that from that time on elections would be held by equal, secret, direct, universal suffrage for persons at least 20 years of age. Under this new law nearly 26 million more people were qualified to vote. An appeal was made to the farmers to form peasants' councils to insure the feeding of the people. A third manifesto was issued to the Prussians asking that autocratic state to begin transforming itself into a thoroughly democratic part of the republic. By November 18 the rulers of the various states —dukes, kings and princes—had abdicated. Several states declared themselves independent republics; riot and revolution prevailed. The Spartacans, an extreme group of socialists, apparently got the upper hand for a while. Other groups of socialists were opposed, at first, to the election of the proposed Constituent Assembly, but by December the revolution of the states and the threatening triumph of bolshevism had been diminished.

On December 16, in Berlin, the nation-

al conference of the Soldiers' and Workers' Councils decided in favor of a national convention. The elections were appointed for January 19, 1919, and the Constituent Assembly met ten days after that date. After months of debating a new German constitution was adopted.

THE CONSTITUTION. The preamble declares that the German Empire is a republic and states that sovereignty is based on the people and that the empire (that is, the federation of provinces, corresponding in a way to our Federal government) should have exclusive rights as to socialization of national resources, weights and measures, fisheries, telegraphs and telephones, foreign affairs, coinage, defense, immigration, customs, posts, colonies, railroads, and a great many other matters of interest to all the people.

Individual states have legislative rights provided they do not conflict with those of the republic. Each state must have a constitution and a legislature elected by equal, general and secret ballot. The president is chosen by the entire German people, not by the national assembly. He holds office seven years. The chancellor is equivalent to a vice-president. He and the ministers are to be appointed by the president, all of whom may be impeached by the assembly upon charges signed by 100 of the members. The Imperial Council is composed of representatives from the states, each being allowed at least one. A citizen of any state has equal rights in any other state in the republic. Freedom of speech, press and religion are assured. There is no censorship excepting for moving pictures. Illegitimate children have legal status equal to those born in wedlock. The protection of the mother, of youth and of family life are a state care under the constitution. All titles of nobility are abolished except as considered a part of the name, and no German may accept a title from any foreign state.

TERRITORIAL CHANGES DUE TO WORLD WAR. Germany ceded to France 5,600 square miles of Alsace-Lorraine; to Belgium 382 miles between Luxembourg and Holland; to Poland the southeastern tip of Silesia, most of Posen and West Prussia, 27,686 square miles; moreover, Germany relinquishes control of 40 square miles north of the River Memel; 729 square miles in and about Danzig; and the Saar Basin 738 square miles. There is a possibility of the Saar being restored to Germany fifteen years hence, if a popular vote so decides. Also, plebiscites will determine the nationality of a part of Schleswig, 2,788 square miles, the southeastern third of East Prussia, and the area between East Prussia and the Vistula, 5,785 square miles. All of the African possessions were placed under British mandatories.

Besides being thus penalized, Germany was ordered by the Reparations Commission to indemnify fully both France and Belgium for damage done during the invasion; the indemnity to be in the form of gold, goods and art treasures. This resulted in extreme economic strain for Germany and gave rise to constant conflict between the French and German governments. Finally, German currency was deliberately inflated until it had no practical value in the world's markets. The new republic pled for an extension of time for the payment of the indemnity; France refused to grant an extension. This resulted in still further economic depression and more riots in Germany, and finally, in a French and Belgian invasion of the Ruhr early in 1923. A few casualties resulted from this invasion, but for the most part the Germans resisted passively.

Germany's economic machinery—when viewed in the light of pre-war conditions—is still badly disjointed. But with her natural resources, the energy and ability of her people and the gradual reestablishment of her trade relations with other nations, Germany, somewhat chastened, should again take her place among the world's important nations in the near future.

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Area, square miles	185,890
Forest area, acres	30,000,000
Population (1921)	60,282,000
Chief cities:	
Berlin	3,801,000

Hamburg	985,779
Cologne	633,904
Munich	630,711
Leipzig	604,380
Dresden	529,326
Breslau	528,260
Essen	439,257
Frankfort-on-Main	433,002
Dusseldorf	407,328
Nuremburg	352,675
Hanover	310,431
Stuttgart	309,197
Chemnitz	303,775
Dortmund	295,026
Magdeburg	285,856
Konigsberg	260,895
Bremen	257,923
Stettin	232,726
Duisburg	244,302
National revenue	$ 1,278,156,000
Bonded indebtedness	$71,000,000,000
Farm area, acres	100,000,000
Improved area, acres	78,000,000
Wheat, bushels	97,864,000
Rye, bushels	260,144,000
Oats, bushels	324,880,000
Barley, bushels	89,056,000
Potatoes, bushels	985,234,000
Hops, pounds	13,283,000
Sugar beets, short tons	1,211,944
Domestic animals:	
Horses	3,588,005
Cattle	16,900,000
Sheep	6,630,000
Goats	4,870,000
Swine	14,220,000
Raw sugar, tons	1,194,000
Beer, gallons	545,996,000
Alcohol, gallons	29,135,656
Molasses, gallons	163,000
Coal, tons	127,700,000
Iron ore, tons	6,750,000
Potash, tons	8,500,000
Rock salt, tons	1,600,000
Zinc, tons	313,000
Copper, tons	677,000
Pig iron, tons	6,111,000
Ingot steel, tons	7,400,000
Miles of railway	35,919
Teachers in public schools	39,268
Pupils enrolled	10,309,000

German Literature. See LITERATURE.

German Silver or **Nickel Silver.** See ALLOW.

Germans, an important Teutonic race inhabiting central Europe. The people were known to the Romans as Germani. At the beginning of our era the Germani, or Germans, occupied central Europe from the Vistula and the Carpathians on the east to a point westward of the Rhine. During the third and fourth centuries many German tribes migrated. The Vandals settled in Spain and now form a part of the Spanish people. The Lombards settled in the valley of the Po and were absorbed by the Italians. The Franks and the Burgundians contributed to the present population of France. The Germans were forced from a part of their territory by the Slavs, who broke over the Carpathian barriers. Descendants of the ancient Germans formed the great majority of the German Empire. About one-fourth of the inhabitants of Austria-Hungary were Germans. The Baltic provinces of Russia contain about a million Germans. Two-thirds of Switzerland is inhabited by people of Germanic race and language. See AUSTRIA; GERMAN EMPIRE.

Germicide, a germ killer. Current discussions divide germicides into three classes—mechanical, physical, and chemical. Germs are so minute that no process of grinding or pounding can be effective. Prolonged shaking prevents multiplication in many cases, and even kills germs. Of physical agencies, heat, light, cold, and electricity are the most important. Heat is the most effective; electricity the least so. No germ can withstand a high degree of heat. Nearly all germs are killed by the temperature of boiling water. Speaking in a general way, bacteria can stand more heat than animal germs. Freezing kills some germs; others live dormant in ice. Some live even in liquid air. There is no practical method of killing bacteria by freezing. Prolonged sunlight is nature's great germicide. Some forms of disease seem to yield to the influence of red light, X-rays, radium, etc., but the nature of their action is not understood, nor are the results certain. Strong, white sunlight is the greatest of physical germ destroyers. Electrical currents cannot be depended upon to kill germs. Polluted water, through which a powerful current has been passed, is found to be full of germs. Of chemical germicides, carbolic acid is without a superior. Other anti-bacterial agents are ammonia, chloride of lime, creosote, formaldehyde, alcohol, hydrogen peroxide, mercury, and iodine. Sulphur is less in favor than formerly. A number of oils, as

of peppermint, pennyroyal, turpentine, and mustard are effective. Quinine and its ally, salicylic acid, are the standard remedies for malarial germs. Fortunately the blood itself, or rather the serum of the blood, is one of the most efficient germicides in nature.

Germination, sprouting, the formation of a plantlet. Three conditions are requisite—moisture, warmth, and oxygen. Moisture softens the coverings of the seed, relaxes the embryo, and dissolves and renders available the plant food stored by nature in the seed. Air supplies oxygen. Warmth stimulates vital action, just how cannot be known until we know what life is. The temperature requisite to promote germination varies for different seeds. Some seeds sprout at the temperature of ice water; others require a temperature of 60° F. to start. Wheat, the hardiest of our cereals, sprouts at a temperature of 36° F. Experience has found that the germination of wheat, rye, oats, and flax goes forward most rapidly at a temperature of from 77° to 87° F., and that corn and pumpkin seeds sprout best at 92° to 101° F. Corn that will sprout in three days at 65° F. requires 11 days at 51° F. Oats that sprout in two days at 65° F. require 7 days at a temperature of 41° F. Many seeds, especially oily seeds like mustard may lie in the ground for years without sprouting; but, once started, it is desirable that the growth be not checked by a change of conditions, as a checked plantlet is likely to be a stunted plantlet. See SEED; AGRICULTURE.

Gerome, Jean Leon (1824 - 1904), a French painter and sculptor, one of the most eminent of the later nineteenth century artists. He was born at Vesoul, Haute-Saone, France, the son of a goldsmith. M. Gerome began study under Delaroche at the age of 15. In 1847 he competed unsuccessfully for the Prix de Rome but the picture he submitted, *Greek Cockfight,* created a sensation. He spent years in travel, gathering much material for his later work. He painted many pictures, most of which are in France, although the Metropolitan Museum in New York contains some of his best work. For a time during his later life, M. Gerome almost abandoned painting for sculpture. A partial list of his pictures is here given: *Phryne Before the Tribunal, Cleopatra and Caesar, Gladiators Before Caesar, Pollice Verso, Duel After a Masked Ball* and *Promenade In the Harem.* His best sculptures are *The Entry of Bonaparte into Cairo* (Luxembourg Museum), *Frederick the Great, Tamerlane, Tanagra,* and a tinted marble bust of Sarah Bernhardt.

Geronimo, jĕ-rŏn′ĭ-mo, an Apache chieftain. He came into notice before the Civil War as the daring and wily leader of a band of Apaches who were the scourge of Arizona and New Mexico. In 1886 he and his followers were penned up in the mountains by General Crook and were forced to surrender, but escaped while on their way to a reservation and took up their old trade of burning and plundering. Finally General Miles trailed Geronimo and his braves from cañon to cañon and, between starving and fighting, forced them to give up. A number of the prominent Apaches were sent to Fort Pickens. Later Geronimo was removed and held a prisoner at Fort Sill, Oklahoma, where he died in 1908.

Gerrymander, gĕr-ry-man′der, an arrangement of legislative or congressional districts designed to give the party in power an unfair advantage. If, for instance, a naturally compact district that would return a representative of the opposing party be split up and attached to various districts in such a way that its political influence is overcome and the dominant party carries more districts than it is fairly entitled to carry, the process is called gerrymandering. The term originated in Massachusetts in 1812, while Elbridge Gerry was governor. The Republicans were in power and redistricted the state so as to group together those counties that returned large Federalist majorities, and in this way reduce the Federalists' representation in the legislature. One of these districts was so irregular in outline that it resembled a salamander. A Federalist wit called it a Gerry-mander, and thus the name was coined.

Ghent, gĕnt, an important city in Belgium. It is situated on the "lazy" Scheldt, and is divided by numerous canals into twenty-six islands or blocks connected by 270 bridges. Ghent is noted for the manufacture of cotton, linen, thread, ribbon, cutlery, paper, pottery, hosiery, engines, leather, ropes, and beer. It is a busy, thriving industrial and commercial city with a population in 1910 of 160,000. Tourists are interested in the old walls and gates; in the nunneries where exquisite lace is made; in the university and a library of handsome old books and hand illumined manuscripts; in a bell tower with a chime of forty bells; and in the old churches with stained windows and paintings by the masters. The church of St. Michael contains a painting of the Crucifixion by the celebrated Van Dyck. There are several hundred hothouses. Bulbs are raised for florists of both Europe and America. Ghent has the most wonderful floral shows in Europe. The treaty of Ghent which closed the War of 1812 was negotiated here.

Ghetto (gĕt′ō) **The,** the Jewish quarter of large cities. The term arose in Italy in connection with the Jewish quarters in the cities of Lombardy and other parts of Italy. In the medieval towns the Jews were compelled to live apart from the Christians. At Cordova the Moslems drove "dogs and Jews" to live outside the city walls. The famous ghetto of Rome was destroyed in 1885 to make room for a new embankment along the Tiber. The largest and most populous ghetto in the world is a down town tenement quarter in New York City. Over a third of a million Hebrew people are packed into houses, many of them unfit for occupancy. They eke out a living largely by working on ready-made clothing by the piece.

Giant, a person of unusual height or bulk. In Grecian mythology, the giants were descendants of Uranus and Gaea. They warred against Zeus, but were subdued, and many of them were buried under Mount Aetna and other volcanoes. It is possible that the story of the conflict between gods and giants had its origin in volcanic convulsions. Hercules, Orion, and Polyphemus are famous giants of Grecian legend. In Scandinavian mythology the giant Ymir was the first created being. Jotunheim was the home of the giants, of whom Skrymir was one. He was so enormous that on one occasion Loki, himself of the giant race, Thor, and Thialfi, being lost in a forest, found refuge in Skrymir's glove, thinking it to be a huge cave.

The legends and traditions of all nations are full of tales of giants. One of the stories which never loses its charm for children is that of *Jack the Giant Killer,* which is of Welsh origin. A belief in people of monstrous size and strength seems to be natural to primitive people and to children. We learn that, when the science of fossils was in its infancy, many impostures were passed off on the people. The bones of animals having no similarity whatever to the human form were pieced together under the pretense that they were the remains of giants even sixty feet in height. See HEIGHT; DWARF; PYGMY.

Ghiberti, Lorenzo (1378 - 1455), an Italian goldsmith and one of the greatest sculptors of the early Renaissance, was born at Florence. In 1401 the Merchants Guild of Florence, decided upon two new doors for the baptistry, and all the artists of Italy were invited to compete. Among the competitors were Ghiberti, Brunelleschi, Jacopo della Quercia and Nicolo d'Arrezzo. Ghiberti won the competition, because of the superiority of his design in line and composition. Ghiberti was engaged for almost 20 years on the first gate. It consists of 28 panels, representing incidents in the life of Christ, the Church fathers and the Evangelists. So well had Ghiberti wrought that he immediately reecived a commission for a second gate. Upon this one he spent another 20 years, choosing subjects from the Old Testament. The bronze gates, perfect in form and finish, are among the finest works of art in Italy. Michelangelo said of them that they were "worthy to be the gates of Paradise"—high praise, but praise well deserved. Besides the gates, the chief existing works of Ghiberti are the three bronze statues of St. John the Baptist, St. Matthew and St. Stephen, as well as several fine reliefs.

Giant Despair, in Bunyan's *Pilgrim's Progress,* the owner of Doubting Castle. See BUNYAN.

Giant's Causeway, a noted rock formation on the north coast of Ireland. The "causeway" is a tract of basaltic columns laid bare by the waves. Tourists make their way for a long distance on an uneven floor, walking on the upper ends of 40,000 upright, six-sided columns that stand side by side like the trunks of trees. This basaltic outflow is part of the formation in which Fingal's Cave has been worn by wave action. In cooling the basalt simply cracked into regular six-sided columns instead of into the irregular cakes to be seen at the former bottom of a dried out mud puddle. See FINGAL'S CAVE; BASALT; CAVE.

Gibbon, Edward (1737-1794), an English historian. A native of Surrey. He was educated at Westminster, Oxford and Lausanne, Switzerland. Gibbon traveled extensively in southern Europe. He entered the English Parliament as a Tory in 1774. In 1764, while he was in Rome, it occurred to Gibbon to write a history of the Roman Empire, a composition to which he devoted twenty-four years. The first volume of his monumental work, a *History of the Decline and Fall of the Roman Empire,* appeared in 1776, and the last in 1788. It is said that, when his task was finally ended, Gibbon did not know what to do with himself. During the years 1783-93 he resided in Lausanne again. Gibbon inherited wealth, but was never married, the romance of his life being an unsuccessful suit for the hand of the Swiss lady who became Mme. Necker and the mother of Mme. de Staël. He never took the matter to heart evidently, for he visited Madame Necker in Paris. A friend speaks of seeing the future Madame de Staël "romping about the knee of the decline and fall."

Gibbons, James (1834-), the well-known cardinal of the Roman Catholic church in the United States. He was educated in Baltimore, his birthplace, being graduated from St. Mary's Seminary in 1857. In 1861 he became pastor of St. Bridget's church in that city, and seven years later was made Vicar-Apostolic of North Carolina. In 1872 he was made Bishop of Richmond, Virginia, and remained there five years, going then to become Archbishop of Baltimore. This is the largest and most influential diocese in the United States. Pope Leo XIII recognized in him a man of exceptional ability, and in 1886 made him a cardinal. He has been a very influential and progressive churchman, and a leading spirit in reform. He is the author of *The Faith of Our Fathers, Our Christian Heritage,* and *Ambassadors of Christ.*

Gibraltar, a rocky peninsula near the southern point of Spain. It is situated eastward from the narrowest point of the strait. Its southern point is about fifteen miles from the mainland of Africa. The rock lies between the Mediterranean on the east and a deep inlet or bay on the west, in which shipping finds a fine harbor. The population of the town which nestles by the harbor at the west foot of the crag is 19,586.

Gibraltar was wrested from Spain by Great Britain during the war of the Spanish Succession. Its possession was secured to England by the treaty of Utrecht, 1713. Immense sums of money have been spent in converting it into the strongest fortress in the world. The rock itself is about two miles long and three-fourths of a mile in width. The summit is 1,439 feet, a quarter of a mile, above sea level. The northern and the eastern faces are almost perpendicular. The southern shore consists of tremendous precipices; the western shore is not quite so steep, but it has been fortified with batteries of the heaviest guns in the world. The rock consists for the greater part of limestone. There are many natural caves. Not less than three miles of galleries large enough for the passage of carriages have been tunneled. Enormous rock cisterns have been constructed to store up rain water for the use of the garrison. The barracks are provided with stores of provisions and ammunition sufficient to withstand a siege of several years.

Gibraltar is not without vegetation. There are small groves, clumps of shrubs, and many little glens in which the almond, olive, orange, lemon, pomegranate, fig, and

a profusion of wild flowers grow. The rock shelters rabbits, partridges, pigeons, and woodcocks. If not extinct, there are still a few Barbary apes, the only animal of the sort in Europe, clambering over the cliffs.

Millions of dollars have been expended in improving the harbor of Gibraltar. It now has a naval dockyard in which the largest ships may be repaired. Enormous supplies of food and coal are kept here for sale to merchant steamers on their outward and homeward bound voyages.

Gibson, Charles Dana (1867-), an American illustrator and artist, one of the greatest living masters of black and white, famous as the creator of the "Gibson Girl," the characteristic American society woman. Mr. Gibson was born at Roxbury, Mass., and studied at the Art Students' League, New York, under Saint-Gaudens in Paris, and in London and Munich. His work has appeared in *Life*, *The Century*, *Harper's*, *Scribner's* and other magazines. Mr. Gibson has a strong dramatic and strong humorous sense, and his characters are the everyday people of the courts, hotels, boulevards, parks, theatres and clubs of America. Much of his work has been published in album form, and includes *Drawings*, *Sketches and Cartoons*, *Pictures of People*, *The Social Ladder*, *The Americans* and others. The titles are very suggestive of the nature of Mr. Gibson's best work. He purchased a controlling interest in *Life*, and took active charge in 1920.

Gideon, a Bible character and a favorite hero of the ancient Jews. In Judges vii: 19, it is told how Gideon was called upon by an angel of the Lord to deliver his unfortunate people from the Midianites. Thereupon he went to battle, taking only 300 picked men, each armed with a sword, a trumpet and a pitcher containing a lamp. Attacking the camp of the Midianites at night, Gideon gained a victory. He was later made the fifth judge of Israel.

Gideon's Band is an organization of commercial travelers, which was organized at Boscobel, Wis., in 1899. One of the objects for which it was formed is the placing of Bibles in the guest rooms of hotels. *The Gideon*, a monthly magazine, is the organ of the society.

Gila (hē'la) **Monster.** See LIZARD.

Gilbert, Sir Humphrey (1539 - 1583), an English navigator, half-brother of Sir Walter Raleigh. Dartmouth is his birthplace. He studied at Eton and Oxford, planning to study law, but abandoned the idea and entered the army. He was knighted for gallant service in Ireland in 1570, and served five years in the Netherlands. Becoming interested in the voyages across the Atlántic which were being carried on then, he published a pamphlet, *A Discourse of a Discovery for a New Passage to Cathay*. Cathay was the name then in use for China. In 1578 he and his young half-brother set out with seven ships to discover new lands for Queen Elizabeth. The history of the voyage is obscure; they returned the next year, having lost a ship and its men. Four years afterward he set sail again and reached Newfoundland, taking possession of it in the queen's name. On the way home his ship sank suddenly and all were drowned.

Gilbert, William (1540-1603), an eminent English physicist and physician to Queen Elizabeth. Though by profession a physician his fame rests upon his treatise, *The Magnet*, published in 1600, in which is given the results of eighteen years' experimentation at such odd times as he could spare. From the time of Thales, twenty-three centuries before, scarcely anything had been added to the little then known of electricity—the bare fact that amber when rubbed would attract light bodies—till Gilbert made known most of the phenomena of frictional electricity; while in the field of magnetism he discovered more facts on the subject than have been found since. He pronounced the theory that the earth as a whole is a magnet, and explained most of the peculiarities in the compass' behavior. He recognized the magnetic field, the effects of heat on a magnet, and the principle of induction. In fact, modern electricity may be said to have had its beginning with Gilbert and the appearance of his work in 1600.

Gilbert, Sir William Schwenk (1836-1911), an English dramatist who, in col-

laboration with the composer Sir Arthur Sullivan, produced the famous Gilbert and Sullivan light operas. He was born in London and was graduated from the London University. In 1864 he was admitted to the bar. As a contributor to *Fun*, Sir William became popular for his *Bab Ballads*. In 1866 he wrote his first play, a burlesque entitled *Dulcamara*. But his greatest success came after the formation of his partnership with Sir Arthur Sullivan. Their first operetta, *Trial By Jury*, was successful, and was followed by *Patience*, *The Mikado*, *The Pirates of Penzance*, *The Gondoliers* and *H. M. S. Pinafore*. These operas are clean, witty and melodious, and have been the delight of theatre goers ever since their first appearance.

Gil Blas, zhēl blăs, **of Santillane,** săn-tĭl-ăn, **The Adventures of,** a well known novel by Alain René Le Sage. The scene of the story is laid in Spain, about two hundred years ago. The hero, Gil Blas, is represented as telling his own story. In reality the book is a series of stories or scenes of life among various classes of people, the connecting thread being of an inconsequential character. Le Sage was a Frenchman who was never in Spain. He has succeeded, however, in writing a story which is true to nature, and which is full of wit and satire. The first volume of *Gil Blas* was published in 1715, the second in 1735. The story has been translated into English by Tobias Smollett. See Le Sage.

Gild or **Guild,** an association for the promotion of common interests. "Gild," says Blackstone, "signified among the Saxons a fraternity, derived from the verb *gildan,* to pay, because every man paid his share toward the expenses of the community, and hence their place of meeting was often called the guild or guildhall." The name may be applied properly to any association of fraternal purpose, as the Men's Gild of Trinity Church, The Gild of the Essex Bar, etc. Gild may be used in a literary and less proper sense in such an expression as the gild of newsboys, or gild of bootblacks. The medieval gild is a subject of unusual interest. It grew up with the growth of cities.

The medieval gilds were of two sorts, the merchants' or traders' gilds and the artisans' gilds. The typical merchant gild was composed of traders who united to further the business of buying and selling. These gilds sprang up in the trading towns everywhere, and took the lead in such matters as purchasing freedom from local lords, obtaining permission to hold fairs, and in getting town charters from the ruler of the land. In case a city grew and had varied interests, a number of merchant gilds arose. Some of these gilds built halls of great magnificence. The Hall of the Clothmaker's Gild at Ypres (ē-pr) is one of the notable buildings of Christendom. The gilds were so closely identified with the government of medieval cities that the term gild hall was used interchangeably to denote a town hall and a hall where the gilds met for deliberation. In fact, the merchant gild was in some cases the city council.

The second type of gild is known as the craft gild. It held usually a charter from the town or king. The craft gild was an association of artisans employed in the same sort of handiwork. The number of merchant gilds was limited—ordinarily one in a city—but the number of craft gilds was limited only by the number of skilled occupations. There were gilds of bakers, candlemakers, grocers, spinners, weavers, fullers, dyers, clothworkers, goldsmiths, saddlers, bow makers, carpenters, masons, glovers, tanners, and so on to the end of the list. York had fifty craft gilds. Cologne had above eighty.

There were over a hundred gilds in London. Twelve gilds, noted for wealth and influence, were called the Twelve Great Companies. They were the mercers, grocers, drapers, fishmongers, goldsmiths, skinners, merchant tailors, haberdashers, sutlers, ironmongers, vintners, clothworkers. Other gilds whose occupations are now extinct were the bowyers, broderers, girdlers, horners, loriners, pattenmakers, and scriveners. Some eighty of the London gilds yet exist. About forty still possess halls. They meet in rooms, at gildhalls, or in the offices of their respective secretaries. Some of the gilds still own enormous property. Fishmongers' Hall has a

yearly income of $100,000. The Merchant Tailors' Gild has become a wealthy Tory club; another has become a Whig club. These London gilds cling to their charters with reverence. Most of them are conducted as fraternal orders, having especial care for the widows and orphans of their membership. On occasion, as the inauguration of a mayor or a civic procession, the members turn out like Odd Fellows and Masons in the liveries—gowns, furs, headgear, etc.—of their respective gilds.

The craft gilds consisted of three sorts of persons, master workers, journeymen, and apprentices. The master workman might or might not be a person of wealth; but even the humblest was necessarily a man of sufficient capital to command a home in which to live, to work, and to expose his wares for sale. The master employed journeymen and apprentices. An apprentice was bound to a master for a term of years, usually three, seven, or ten, according to the difficulty of the trade to be learned. During this period the apprentice lived in the family of the master and received food, clothing, lodging, and instruction in his art. At the expiration of his apprenticeship, he was free to tramp from city to city, earning wages from any master that cared to employ him. If skillful, industrious, and thrifty, he might hope to settle into a shop of his own, much after the fashion of the journeyman printer of today.

The traders' gild was the older type. In later years it was crowded somewhat by craft gilds. Many artisans were also tradesmen. The swordmaker usually exposed his wares in the front room of his shop. At seasons the master left his shop to the care of others and took the road, probably with a string of packhorses, to visit the fairs and sell his wares. The two types ran together somewhat, so that it is convenient to speak of the gild system as a whole. The gilds occupied a large place in medieval society. They sought and obtained charters granting them monopoly. Under ideal conditions, which may or may not have prevailed in their entirety, none but members of the city gilds might trade in the city, or, if outsiders came in, they did so on payment of proper fees and in the interest of wares not produced locally, as in the case of cloth merchants. None but a member of the shoemakers' gild of York might make shoes in York. By forbidding intersale of shoes made elsewhere, and by regulating the number of journeymen and apprentices per master, the market was relieved from modern competition. A proper number of workmen were kept busy. The germs of the labor union were here.

Prices and times and places of sales were fixed by the gilds. Materials were purchased in a spirit of coöperation, and each member of the gild "had a right to share in any purchase made by another." Grades of material and standards of workmanship were established and maintained by a system of fines leading, in extreme cases, to expulsion from the gild and loss of a livelihood. In essential respects, the gilds were monopolies, but they were monopolies conducted in the interest, not of a few wealthy members, but ordinarily in the interest of many members of moderate means. In looking after quality, weight, and measure, in defending the buyer against the scant gallon, the short yardstick, and adulteration, the gild benefited both buyer and seller.

A para'lel, which it were unprofitable perhaps to carry too far, may be drawn between the medieval gilds and chivalry. Chivalry, knight, and squire made lords and vassals—feudal tenure of land—possible. The medieval gilds, with their enlightened selfishness, made cities possible. Both chivalry and the gilds were aristocratic. Knighthood was the dominant element in camp, court, castle, and manor, It presumed a vast body of common people, freeholders and serfs. In like manner, though not to such a degree, the merchants in their gilds and the masters and journeymen in their gilds formed an aristocratic, a dominant, element that controlled the towns. In some cities the gild members and their families constituted doubtless a large part of the population; but, in any case, one not a member of a gild was a mere laborer, without voice and without citizenship. It goes without saying that gilds differed in wealth, influ-

ence, and in social standing; but there was a greater difference between membership in the humblest gild and membership in none at all. The citizens—the burghers of whom we read—were gild members. Beneath the gilds, there was a substratum of low degree, corresponding to the serfs and villeins that underlay feudal society. Virtually the only way to rise from the rabble lay through the jealously guarded door of the gild.

The thoughtful reader cannot fail to note that the medieval gild did, in a way, the work of several special institutions of the present day. In addition to being in a varying degree boards of trade, chambers of commerce, inspectors of weights and measures, pure food departments, interstate commerce commissioners, insurance companies, boards of aldermen,—they were fraternal orders caring for their own—not everybody's—needy; and they were social organizations devoted to banquets and drinkings. The gilds cherished the arts and the sciences. They stood for thrift and for peace. They made the cities possible and were at all times a counterpoise to chivalry.

The gild was based on essentially sound social principles. It was selfish, not for itself, but for its members. It never considered the welfare of the gild superior to the prosperity of the members. It did not rank the government as a thing above, and apart from, and superior to the governed. Dishonesty, private monopoly, extortion, secret rebates, sugar trusts, oil trusts, and coal trusts were as foreign, as unthinkable, as were cut-throat competition and shoddy workmanship. If the genuine gild idea could be expanded to include the whole world in a universal gild, we should have no need for a millennium.

Search shall be made at hucksters' houses for bread made outside the town. Such bread is forfeited.

Horse loaves shall be made two for a penny, of clean beans; otherwise, a fine must be paid, which goes half to the city and half to the guild. No baker shall be allowed in the town, unless a freeman, and also one of the guild.—*From the Bakers' Guild at Exeter.*

Common fines shall go into the stock of the guild. Brethren shall bequeath something to the guild, if they make wills. If a brother be foulmouthed to another, he shall be fined; and, on repetition, shall be further punished. Heavy fines shall be paid for bodily hurt done. Weapons shall not be brought to guild-meetings. None shall be taken into the guild without paying at least forty shillings, saving the sons and daughters of guildmen. Help shall be given to poor and ailing brethren. Dowries shall be given to poor maidens of good repute [in the guild]. Poor brethren shall be buried at the cost of the guild. Help shall be given to brethren charged with wrong-doing. If the brother has been rightly charged, he shall be dealt with as the aldermen and brethren think well. No lepers shall come into the borough, a place for them being kept outside the town. No dung or dust-heaps shall be put near the banks of the Tweed.

Underhand dealings in the way of trade shall be punished. If any one buy goods, misled by false top samples, amends must be made. Forestalling of the market shall not be allowed. Wools and hides shall not be engrossed by a few buyers. The affairs of the borough shall be managed by twenty-four discreet men of the town, chosen thereto, together with the mayor and four provosts. The mayor and provosts shall be chosen by the commonalty.

Bewrayers of the guild shall be heavily punished. Out-dwelling brethren of the guild must deal in the town on market-days. . . .

No woman shall buy at one time more than a chaldron (36 bushels) of oats for making beer to sell. . . . Whoever buys a lot of herrings, shall share them, at cost price, with the neighbors present at the buying. . . . Tanned leathers, brought in by outsiders, must be sold in open market and on market-day. . . . No one shall have more than two pair of mill-stones.—*From the Guild of Berwick-on-Tweed,* 1283-1284.

Gilder, Richard Watson (1844-1909), an American editor and poet. He was a native of New Jersey and became managing editor of the *Newark Advertiser.* He was editor of *Hours at Home,* and in 1870, when that publication was merged with *Scribner's Monthly,* he became managing editor of the latter. Ten years later he succeeded J. G. Holland as editor-in-chief, which position he retained after *Scribner's* became the present *Century Magazine,* and until his death, which occurred November 18, 1909. He has published many verses. Not only was he an editor and a poet, but he was a lecturer on great reforms and a recognized authority on public questions. A collection of Gilder's poems, published in 1894, entitled *Five Books of Song,* contains his best poems. He has also published *In Palestine and Other Poems,* and *Poems and Inscriptions.* A short poem on New York

City, where Mr. Gilder made his home for many years, will serve as an example of his style:

Oh, dear is the song of the pine
  When the wind of the night-time blows,
And dear is the murmuring river
  That afar through my childhood flows;
And soft is the raindrop's beat
  And the fountain's lyric play,
But to me no music is half so sweet
  As the thunder of Broadway!

Stream of the living world
  Where dash the billows of strife!—
One plunge in the mighty torrent
  Is a year of tamer life!
City of glorious days,
  Of hope, and labor, and mirth,
With room, and to spare, on thy splendid bays
  For the ships of all the earth!

Gilding, an ancient art of applying a thin coating of gold to surfaces. This may be done by the use of gold leaf or by gold dust in solution. Traces of gilding have been found in the ruins of Egypt, Persia, Greece, and Rome. It was not uncommon to gild statues, ceilings, walls, and furniture. Metals are gilded by various methods, such as rubbing on dry, dipping in baths, applying in the form of an amalgam, paint, etc. The bookbinder uses gold leaf. Lettering and striping are done on leather and cloth by stamping gold leaf with hot brass type. Gilt edges preserve books against dust. They are made by first trimming the paper edges smooth and coating them with fish glue, the best made. The gold leaf is then applied with care to produce a smooth surface. The gold stripes of porcelain are applied with a camel's hair brush, and are burnt in to secure permanency. Among the buildings in which gilt has been used to secure massive effect, St. Peter's at Rome is an example. Gilt picture frames and cornices are used in modern houses, but are yielding to natural woods. The new Congressional Library at Washington is heavily gilded in a style of barbaric splendor, not in keeping with republican simplicity or correct taste. See LIBRARY OF CONGRESS; PAINTING.

Gilead, a mountainous district on the east side of the Jordan, the boundaries of which are set forth in different ways in the Old Testament. In general, it includes the entire mountain region between the Yarmuk on the north and the Arnon on the south, the desert table lands of Arabia (the plains of Bashan) forming the eastern boundaries, and the Jordan river bounding it on the west. It is a fertile and beautiful region, where the vegetation is luxuriant, and is well provided with water and woodland. The district is well suited to pasturage (Num. xxxii. 1). Its history is interesting. Here Absalom fled from the wrath of his father, and subsequently David found refuge here; Elijah tarried here, and Jesus made visits in the vicinity. Among the principal cities were Mahanaim, Succoth, Penuel, Mizpeh, Jazer, and in later times Pella and Gerasa.

Gilia, an American flowering plant allied to phlox and the garden sweet william. Numerous species are found on the plains and in the mountains as far west as the Pacific coast. Gilias vary greatly from low matted plants clinging to the crevices of a mountain slope to tall, imposing meadow plants. The gilia of the west corresponds to the phlox of the east.

Gillette, William Hooker (1855-), a famous American actor and playwright, born at Hartford, Conn. He studied at the universities of Boston and New York, while playing in stock companies. He dramatised Sir Conan Doyle's stories, and his work in the title role of *Sherlock Holmes* won him great popularity. He wrote a number of popular plays, including *Secret Service,* one of his best; *Held By the Enemy, A Legal Wreck, Because She Loved Him So, Too Much Johnson.*

Gills, respiratory organs of animals breathing oxygen under water. Not all such animals have gills, for the lower forms of life breathe through the entire body-covering, it being thin enough for that purpose. But when some water animals developed thick coverings, such as scales, special organs for breathing became necessary, and gills developed. They are found always in pairs, and are simply outgrowths of the body wall, consisting of a thin membrane shot with blood vessels and bathed constantly in water. The blood vessels absorb oxygen from the water and carry it to the tissues, probably taking back carbonic acid gas to be excreted by the gills. See FISH.

Gilman, Daniel Coit (1831-1908), an American educator who as the first president of Johns Hopkins University contributed greatly to establishing true university education in the United States. He was born at Norwich, Conn., was graduated from Yale University in 1852, and subsequently studied and traveled in Europe. From 1855 to 1872 Dr. Gilman was connected with Yale as librarian, professor of physical and political geography and director of the Sheffield Scientific School. He was president of the University of California from 1872 to 1875. In the latter year he was elected to the presidency of Johns Hopkins University, where he served until 1901. Dr. Gilman served as president of the American Oriental Society from 1983 until 1901, and in 1907 was appointed trustee of The Russell Sage Foundation for Social Betterment. He was appointed by President Cleveland to the commisison to determine the boundary line between Venezuela and British Guinea. Dr. Gilman was an ardent worker for the cause of better education facilities for the South. He is the author of *Launching a University, The Life of James D. Dana, The Life of James Monroe* and *Science and Letters in Yale*. Dr. Gilman was one of the three general editors of the first edition of the *New International Encyclopedia*.

Gilmore, Patrick Sarsfield (1829-1892), an Irish-American bandmaster. He was born near Dublin, Ireland. At the age of eighteen he went to Boston, and soon after organized Gilmore's Band. He arranged the Peace Jubilee in Boston in 1869 and the World's Jubilee in 1872. He composed military and dance music. *Columbia,* intended as a national hymn, is his most noted composition.

Gin, an aromatic spirit. It is prepared by redistilling rye whiskey and flavoring the product with juniper berries. The name is an abbreviation of the French word for juniper. This kind of ardent spirits was formerly manufactured largely at Schiedam, Holland. See ALCOHOL.

Ginger, jĭn'jer, a well known spice or flavoring. The common ginger plant is found in both the East and the West Indies. Thick, fleshy, root-stocks, the size of a man's finger, send up leafy, reed-like stems to a height of two or three feet; also leafless flowering stalks which bear conical spikes of white, purple-lipped flowers. The ginger of commerce is obtained from the root-stocks, either by drying the root whole, or by scraping and washing. The former plan yields what is known as black ginger; the latter, white ginger. The best article is known as Jamaica ginger, sold usually in the form of fluid extract. It comes from the island of that name. Ginger beer is made from ginger, sugar and lemons, cream of tartar, etc. Gingerbread is a familiar sweet bread. Oil of ginger is used as a remedy to allay pain. Preserved ginger is a popular confection. It is imported from China in fancy jars. To prepare it the young root-stocks are boiled in sirup. American wholesalers import over 400,000 pounds of ginger annually. See SPICE.

Ginseng, jĭn'sĕng, a low herb allied to spikenard and wild sarsaparilla. Ginseng has an unbranched, upright stem a foot high, bearing a whorl of three long-stalked, five-fingered leaves and an umbel of greenish flowers. A cluster of spindle-shaped roots, four to nine inches long, are the ginseng of commerce. The demand for ginseng, especially from China, has led to high prices. Indians and white people have searched our rich woodlands so assiduously that the wild plant is now almost extinct. American ginseng was discovered near Montreal in 1716. The Indians were encouraged to bring in roots, and a trade with China began at once. Prices have risen steadily from 52 cents a pound in 1858 to $5.55 in 1902 and even $8 in 1906. Ginseng raising has of late become quite an industry. Under the influence of increased production the price is falling. In 1908 we exported 154,000 pounds of ginseng valued at $1,112,000. The Chinese supply is drawn in part from Korea and Manchuria. English-speaking physicians make little of ginseng, but with the Chinese it is a cure-all for body and mind. Roots of a certain shape are credited with healing power little short of the miraculous. See MEDICINE.

Ginx's Baby. See JENKINS, JOHN EDWARD.

Giordano, Luca (1632-1705), an Italian painter whose father, a painter of inferior ability, so often urged his son to "work quickly" that Luca earned the nickname of "Fa-presto"—Work-fast. He was born at Naples. Displaying exceptional ability at an early age, the Viceroy of Naples had him placed under an excellent tutor, and the lad learned so rapidly that he was soon fitted for important work. In 1678 he completed an immense picture commemorating the peace between France, Holland and Spain. At the invitation of Charles II of Spain Giordano went to Madrid in 1687 and remained there thirteen years. While at Madrid he painted some of his best frescoes, in the chapel of San Lorenzo, and on the grand staircase of the Escorial. In 1700 Giordano returned to Naples, wealthy and famous. Owing to his ability to work rapidly, the painter has left a vast number of pictures. They are to be found in all the chief European galleries. Among his best works are *Venus and Mars, Jesus Expelling the Traders from the Temple, David With the Head of Goliath, Lot and His Daughters, The Judgment of Paris* and *Moses and the Brazen Serpent.*

Giordano, Umberto (1867-), an Italian composer, was born at Foggia. He studied music at the Conservatory of Naples with Serrao, and while there received the commission to write his first opera, *Mala Vita.* A few years later *Regina Diaz* was presented, but without success. The next opera to follow was *Andrea Chénier,* and this was such a success that it made Giordano famous outside of Italy. *Fedora,* which was first given in 1898, was almost as great a success as *Andrea Chénier,* while *Siberia,* which was given in 1904, was not so successful. After this Giordano did not write any operas until 1913, when *Mese Mariano* appeared. This showed improvement, but did not achieve the acclaim that *Andrea Chénier* did. His latest work, *Madame Sans Gene,* was given in 1915.

Giorgione, (1477-1511), a celebrated Italian painter, the pioneer of the High Renaissance in Venice, when the arts threw off the constraining religious and didactic garments, and took up the cloak of poetic joy of living. Giorgione was born at Castelfranco, the son of poor parents. Of his life too little is known, but we are told that he was beautiful, gracious and learned. We do know, however, that in breaking the bonds of precedent that held most of the painters of his day he prepared the way for the Venetian master, Titian. Already in 1500 the freedom and originality of his work had won him many important commissions. Correctness of line and wondrous subtlety in the handling of color and light and shade mark all of the extant works ascribed to him.

The best judges do not agree upon the genuineness of some of the canvasses supposed to have been painted by Giorgione. There is documentary evidence to prove the genuineness of his alter piece at Castelfranco entitled *Madonna Enthroned Between Saints Liberale and Francis;* his *Gypsy and Soldier,* now at Venice; and *Evander Showing Aeneas the Site of Rome,* now at Vienna. And other works rightly credited to him are *The Holy Family, Christ Bearing the Cross, Sleeping Venus, Jacob Meeting Rachel, Apollo and Daphne, Finding of Moses* and *The Sea Storm.*

Giotto, jŏt-tō, called Giotto di Bondone, an Italian artist born near Florence in the latter part of the thirteenth century. If we take into consideration the times in which he worked, Giotto is one of the greatest of all artists. He was the son of a laborer. It has been thought that he was led to study art by Cimabue who noticed the boy drawing sheep as he herded them, but now he is believed to have been a pupil of the Roman school. His pictures are remarkable for the grace and naturalness of their figures and for their beautiful coloring. Most of his work is religious in character, in accord with the spirit of the age; he decorated part of the church of St. Francis at Assisi, the entire arena chapel at Padua, and part of St. Peter's at Rome with wonderful paintings. His pupils spread his style throughout all Italy; no other man has affected Italian art as great-

THE GYPSIES, OR ROMANY FOLK

1. Gypsy Pastimes in Spain

2. A Gypsy of Granada

3. A Gypsy of Alsace

ly as Giotto. In architecture and sculpture he did not achieve so great a fame as in painting. See CIMABUE; PAINTING.

Gipsies, a wandering folk. The time of their first appearance in Europe is in doubt. Bands are reported in the vicinity of Constantinople as early as the time of Charlemagne. It is a matter of history that, during the first half of the fifteenth century, hosts of gipsies numbering thousands traveled through central Europe as far westward as the gates of Paris. They were supposed to be Egyptians, of which gipsies is a corruption. They called themselves Rom, whence the adjective, Romany, applied to the people and their language. These tribes of vagrants were deemed a scourge. All sorts of idle tales were told to their prejudice. They were said to be heathens, sorcerers, and even cannibals. In England, Scotland, France, Spain, Italy, and Germany, severe laws were passed, forbidding their shelter or harborage.

Chambers speaks of gipsies in the vicinity of Edinburgh condemned in 1636, "the men to be hangit," and "the weomen to be drowned." Their treatment throughout Europe was not unlike the New England treatment of witches. Walter Scott gives a vivid picture of the condition of the gipsies in France in his tale of *Quentin Durward*. Meg Merrilies, the strongest character in *Guy Mannering*, is a gipsy woman.

Among the occupations ascribed to gipsies in various ages and countries are serpent training, fortune telling, acting as guides and messengers, basketmaking, mending of tinware, making of copper and silver jewelry, smuggling, kidnaping, making toys, dancing, playing at merrymakings, horse trading, and thieving. When the belief was no longer prevalent that they were leagued with the Evil One, they were considered lazy, dirty, and fond of smoking and drinking. Even after it ceased to be a Christian act to hang a gipsy to the nearest tree, it was considered prudent to lock the meathouse and guard the poultry roost when a band of gipsies was in the neighborhood.

Their origin was long a disputed question and is not yet determined fully. Bands still wander through a vast extent of territory, including North America, Brazil, Europe, North Africa, Southern Asia, Western Asia, and of late they have made their appearance in Australia. Wherever they travel, the men, at least, assume the garb of the people about them. They learn the language in which they must transact their trades; yet, like the Hebrews, they preserve their own rites, language, and nationality. They are averse to agriculture and cannot endure restraint. In the United States and Europe, at least, they live an outdoor life in some respects like that of Indians. Instead of canoes, they own horses and wagons. They move from place to place with the season, spending the winter in mild southern regions, yet reappearing in the north with their wagons, horses, tents, and swarms of children as regularly as summer comes.

The Romany, Roumania, or gypsy language resembles the Sanskrit, and is related to that spoken by the Hindus. To a Hindu vocabulary they have added Greek and Slavonic words as well as others. It is now pretty well agreed that the gipsies are a race native to India. Although they have exceedingly dark complexions, they belong to the white race. They are slender and agile. The hair is long, jet black, and sometimes wavy. One authority considers that there are about three-fourths of a million gipsies in Europe, with possibly as many more in other parts of the world.

Recently the number of gipsies in some of the countries where they chiefly live was reported as follows:

Spain	50,000
Bulgaria	95,000
Servia	46,000
Roumania	300,000
Turkey	30,000
Persia	20,000
India	30,000

Giraffe, jĭ-răf′, a cloven-hoofed, cud-chewing animal of south central Africa. Naturalists place it between the deer and the antelope. The forehead bears two bony, antler-like projections, covered with skin. The eye of the giraffe stands out so far that the owner is able to see behind him. It is the tallest animal known, attaining a height of twenty feet. The

front legs and neck are of extraordinary length, although the latter contains but seven bones, as is usual in animals of the antelope kind. The giraffe feeds chiefly on the leaves of the mimosa tree which its extraordinary height enables it to reach with ease. In feeding, a slender tongue is thrust out a foot or two beyond the lips and curls around the leaves, drawing them into the mouth. The giraffe is usually fawn colored, and is marked with darker spots, giving it the name of camelopard, or leopard camel. It is a playful, inoffensive animal, bounding away on the approach of danger or defending itself against the lion by tremendous kicks with its hind feet. It is, of course, only a matter of time before the giraffe will be extinct, at least in its native range.

In 1899 rumors of a small giraffe were confirmed by the discovery of the okapi in the forests of the upper Congo Valley. A stuffed and mounted skin was secured for the British Museum. This animal is built on the plan of the giraffe. The head is like that of the giraffe, but there are no external horns. It is about four and one-half feet tall at the withers. The general color of the body is said to range from red to sepia and jet black, with yellowish white cheeks and cream white under parts and legs. The body is surrounded also by rings of black and white, somewhat after the style of the zebra. Students of Egyptian lore claim that this animal is without doubt the original of the pictures drawn to represent the Egyptian god Set.

Girard, je-rard′, **Stephen** (1750-1831), the founder of Girard College, Philadelphia. He was a native of Bordeaux, France. In 1769 he came to Philadelphia. He formed a partnership with a brother and engaged in the West India trade, largely rum and molasses. He was one of the stockholders in the United States Bank. When Jackson removed the deposits the bank kept on in business under the name of Girard Bank. Girard was an eccentric man, gruff and hot-tempered, but in time of public trouble, as yellow fever epidemic, he was kindly, open handed, and regardless of personal exposure. He left $5,000,000 to found a school for poor white boys. This school, known as Girard College, now has $16,000,000 worth of property and an income of $1,000,000 a year. There are sixty-seven instructors and 1,700 students. By a singular provision of the will, no clergyman of any sect whatever is to have any connection with the college. Negroes, also, are forever excluded from the college.

Girondists, a legislative party in the French Assembly of 1791. The name was derived from a circle of active young deputies from the department of the Gironde. The leaders were lawyers of Bordeaux. They were ardent young reformers with high ideals. The Girondist party desired the abolition of the monarchy, but was unwilling to resort to drastic measures. They came into conflict with the Jacobin clubs of Paris, who preferred the guillotine and the torch to fine speeches and correct sentiments. Finally bitterness between the Girondists and the Republican leaders became so pronounced that a decree was passed against the former, under which they were not only expelled from the Assembly, but were hunted down and imprisoned. Twenty-nine Girondist deputies were brought to the guillotine. The remainder were scattered and cowed, and did not make their reappearance in politics until the days of the revolution were over. See FRENCH REVOLUTION.

Glace Bay, Nova Scotia, an important coal mining center, is situated on Glace Bay, at the east end of Cape Breton Island. The town is connected by rail with Sydney, fourteen miles distant to the west, and has a harbor on the Atlantic, which affords communication by water with Canadian and other ports. Glace Bay is the center of the Dominion Coal Company's extensive properties. About 10,000 men are employed in the mines, the annual output of which approximates 5,000,000 tons. The city contains fourteen public schools, including a high school and a school of mining, and has a public library. A powerful wireless station is in service here. The population was 17,007 in 1921.

Glacial Period, or **Ice Age.** Geologists divide the history of our planet into five great periods of time, the last of which is called "Cenozoic Time," the word "cenozo-

ic" signifying recent life. This period of "recent life" is subdivided into two eras, the Tertiary, or Era of Mammals, and the Quaternary, or Era of Man. The earlier part of this Era of Man is known as the Great Ice Age, or Glacial Period, which, although it includes a comparatively small part of those vast eons through which our globe has passed, and although it ended as much as thousands of years ago, is still one of the most remarkable and interesting of geologic episodes.

It must be remembered that these various geologic periods and ages are not marked by any clearly defined limits nor can they be reckoned by years. They are simply great periods of uncounted time which begin and end by gradations frequently overlapping each other. The climate of the Tertiary Era which the Ice Age followed was warm, so much warmer than the present that plants and trees grew to within eight or nine degrees of the north pole. As the Ice Age came on the climate grew colder, especially through the Atlantic basin and the lands on either side of it, that is, northwestern Europe and northeastern North America.

The cause of this epoch is not known with certainty. Various astronomic causes have been suggested, and for the most part discarded. One theory is that the relative position of the earth's poles was changed by the slipping of a comparatively thin portion of the earth's crust. A second explanation is that the cold was caused by an elevation of Arctic lands, which increased the area of land ice and shut off in a measure the warm currents of the Atlantic. A third assumes that the cold climate was due to a decrease of carbon dioxide in the atmosphere. Whatever may have been the cause, northern Europe as far south as Saxony, and North America, north of the fortieth parallel were buried under snow and ice much as a large portion of Greenland is today. The Adirondacks, the Green Mountains, the White Mountains and corresponding portions of Europe were covered by ice. The existing snow fields and glaciers of Norway, of Switzerland and of the Pyrenees are remnants of these great ice sheets. By and by, gradual depressions of land occurred with a consequent spread of cold arctic water and floating ice. This was followed by a gradual re-elevation resulting in snowfields again, and glaciers. Many geologists think that these depressions and elevations were sufficient to make several distinct glacial periods, with corresponding inter-glacial periods of warm climate, when the ice entirely disappeared, and the lands once buried beneath it became covered with vegetation and inhabited by animals and perhaps by men. Others think the alternating depressions and elevations were marked by nothing more than a retreat and advance of the southern limit of the glacier.

Geologists have read this wonderful story of the Great Ice Age in the soil under our feet and in the rocks that lie about us. In the hills and the valleys, the lakes and water courses, they have found traces of a mighty force which has transported sand, gravel, stones, and rocks of enormous size for miles. Rock surfaces have been scratched and polished by the passage over them of masses of material of enormous weight. Mighty boulders have been found whose paths from their original location could be traced backward with accuracy.

No known agent except moving ice could have brought about these effects as they exist in our own country and in Europe. Accumulations of sand, stones, and other debris, left where the glacier began its retreat, are called terminal moraines, and mark the southern limit of the ice fields. A large part of Long Island is, in reality, one of these moraines. The terminal line moves from this point westward with the Ohio River, crosses the Mississippi and then turns northwest to Montana and the Rockies.

The effect of the Glacial Period upon the topography of the United States has been great. First the ice swept away much of the soil and decayed rock of the preglacial period, even digging down into the bed rock itself. Hills were rounded off and cut down, valleys were deepened and widened, streams were turned into new channels, lake beds were filled with sediment, in other cases new lake beds were formed. Northwestern Minnesota, eastern

North Dakota and the eastern part of Manitoba formed the bed of a great glacial lake, which has been named Lake Agassiz. The drainage of the Great Lakes to the northeast must have been obstructed during this period. It is probable that the waters of Lake Superior and Lake Michigan flowed into the Mississippi along the channel of the Illinois, while Lakes Huron and Erie poured their waters down the Wabash into the Ohio. While shut off from their outlet to the northeast these lakes were at a much higher level than at present and formed the old beaches which are to be seen on either side of the present shore lines. As the ice fields melted and disappeared rock material transported by them was left wherever it happened to be. Some parts of the country are covered to a depth of from 200 to 300 feet with this glacial soil. Lake Erie is called a glacial mill-pond.

See GEOLOGY.

Glacier, glā′sher, a stream of slow-moving ice. The typical glacier is formed on a mountain plateau above the snow line by the accumulation of snow. The under layers are pressed into ice and begin a slow journey down the valleys. The rate of movement depends on the size of the glacier and the slope of the land. Glaciers move faster at their centers than at their sides, and faster in warm weather than in cold. A rate as slow as an inch or two a day is nothing unusual. The swiftest parts of the Alpine glaciers move from one to three feet per day. The central part of the Muir glacier in the northern Rockies, it is stated on the authority of the explorer for whom this glacier was named, advances at the rate of ten feet per day. In turning a corner or falling over a slight brow, the ice cracks, forming crevasses, differing in thickness from the width of a knife blade to cracks of thirty feet or more. Sometimes these cracks are several miles long and a quarter of a mile deep. They are frequently hidden by a fall of snow, rendering travel on the surface of the glacier extremely perilous. As the ice stream advances these cracks close up and freeze solid under pressure. This statement need not seem strange, for the crevasses are dripping with moisture, and pieces of wet ice freeze together very readily. Two pieces of ice floating in hot water will unite if pressed together. As the stream of ice pours slowly along it tears off stones, soil, and rocks, sometimes as large as a house, and carries them down the valley. Such a streak of litter is called a moraine. When at the side of a glacier, it is a lateral moraine. When glaciers come together, their uniting edges form a central moraine. The debris deposited at the lower end of the glacier, where the ice melts away, is called a terminal moraine. A terminal moraine in some respects resembles a delta, except that the material composing it is usually very coarse.

The greatest glacier in the world is an enormous field of ice or an ice cap, covering apparently the entire Antarctic continent. Whichever way explorers attempt to reach the south pole, they come upon this field of ice, from the edges of which icebergs, sometimes several miles in diameter, are breaking off into the Antarctic ocean. The north pole is supposed to be situated in an open sea, but a second field of ice covers Greenland with the exception of a single rocky mountain in the interior and a few slender strips of land near the coast. This Greenland ice is the source of the icebergs that drift southward into the path of steamers and render North Atlantic navigation so perilous. Australia has no glaciers; Africa has none, save those descending from two mountains situated, singularly enough, near the equator. The best known glaciers are those of the Alps. They have been studied by many eminent scientists, including John Tyndall, whose *Hours of Exercise in the Alps* is still authority on the subject. There are over 1,000 Alpine glaciers. The largest are from ten to fifteen miles in length. The Rhone glacier, from whose icy front the infant Rhone emerges, is one of the most noted, and is easily accessible. Other European glaciers are found in the Pyrenees, the Caucasus, and especially the mountains of Norway. New Zealand has a number of fine glaciers almost reaching the sea. The Ganges and other Asiatic

rivers take their rise in the lofty glaciers of the Himalayas. In South America glaciers are found throughout almost the entire extent of the Andes. Some of the grandest glaciers of the world are to be found in North America. There are about sixty-five short glaciers in California. There are a number from five to ten miles long in Oregon and Washington, and there are large glaciers along the western coast of British Columbia and Alaska.

One of the most noted is the Muir glacier. It is at least fifty miles in length and twenty-five miles wide. It approaches the sea with a front of twenty-two miles, over two miles of which actually reach into the water, forming a high wall about 300 feet of sheer perpendicular. This glacier may be approached by tourist steamers with perfect safety,

Glacier National Park, a pleasure ground in northern Montana, west of the Blackfeet Indian Reservation, and extending northward from the Great Northern Railway to the Canadian border. It has an area of 1,400 square miles and is a little larger than Rhode Island. The park was set apart as a national pleasure ground and game preserve in 1910. It contains between 80 and 90 glaciers, ranging from a few acres to several square miles in extent; 250 lakes, scores of cascades and waterfalls, clear streams and snow-clad peaks. Good roads and bridle paths lead to places of interest, and during the summer the park is visited by many tourists.

Gladden, Washington, (1836-1918), an American clergyman and author. He was born at Pottsgrove, Pennsylvania. He received his education at Williams College, and was ordained in the Congregational church. In 1882 he became pastor of the First Congregational church of Columbus, Ohio. He wrote many books on social reforms and other subjects. Among them may be mentioned, *Who Wrote the Bible, Plain Thoughts on the Art of Living, Burning Questions, Art and Morality, The Christian Pastor, How Much is Left of the Old Doctrine, Workingmen and Their Employers.* Mr. Gladden was a firm believer in the independence and influence of the American pulpit. He said:

> I do not believe that there is any place of influence in the world in which a man can be as free as in the Christian pulpit. . . . Unquestionably there is cowardice and subserviency in the pulpit, as everywhere else. But there need not be. . . . I have been saying things, with no sense of restraint, during the last fifty years, that I should not have been so likely to say if I had been a journalist or a college professor. . . . I doubt if any other kind of work would have given me so large an opportunity as my churches in North Adams and Springfield and Columbus have given me to speak my deepest thought.

Gladiator, a Latin word for swordsman. In Rome the gladiators were trained swordsmen who fought each other in the arena for the public amusement. Gladiatorial games appear to have arisen in ancient Etruria, near Rome. They grew out of the custom of putting to death slaves and other persons that they might be buried with an honored ancestor, possibly that their shades might accompany him in his journey to the other world. At all events, the first gladiators exhibited in Rome appear to have been three pairs who fought to amuse the public at the funeral of the father of Decimus Brutus, 264 B. C. Gladiatorial shows grew in favor with the Roman public. Thousands thronged to see the sport. High bred ladies crowded the benches. Schools were maintained to train the contestants. Enterprising speculators brought home captive Gauls, Germans, Thracians, negroes and Moors. These prisoners were trained in the art of fighting that they might be let out for hire. When a youthful candidate for office, Julius Caesar entertained the voters by an exhibition of 300 pairs of gladiators. The emperor Trajan, it is said, exhibited 5,000 pairs in the amphitheater that bore his name. The ranks of the gladiators were swelled by the accession of captured brigands and petty criminals of every description, who were given a chance for their lives on condition that they go into training. Ordinarily, participants were armed with shields or bucklers and fought with short swords or daggers. Some carried nets which they were at liberty to fling out with a view to entangling their opponents. Sometimes the gladiators fought two and two; sometimes parties were pitted against each other; sometimes an especially

strong, skillful champion took delight in defending himself against a band of opponents. The bodies of those who were slain were dragged from the arena unceremoniously. A wounded gladiator was at liberty to hold up his hand. If the audience saw fit to grant him his life, they held their thumbs upward. Without this sign of mercy the wounded had no choice but to fight until life was extinct. The Roman populace appear to have taken the greatest delight in gladiatorial fights. These contests were necessarily brutal and appealed to a cruel trait in the Roman character. In criticising the gladiatorial fights of Rome we should bear in mind, however, bullfighting among people of Spanish descent; bearbaiting, practiced in England until of late; dueling, not yet entirely extinct in army circles; cockfighting; and, last of all, prize fighting. If we wonder that slaves could be brought to fight each other with swords, we have only to recall the difficulty with which prize fighters can be prevented from fighting with their fists. See SPARTACUS; AMPHITHEATER.

Gladiolus, glă-dī′o-lŭs (Latin, a little sword), a favorite garden flower allied to our blue flag. There are about 170 species, mostly from southern Africa. They are included in the general name of "Cape bulbs." The Hottentots are said to find as considerable an article of food in the bulbs which they collect as our Western Indians do in the camass bulb. As in the case of blue flag, the gladiolus has sword-shaped leaves and a flower stalk crowded with showy, irregular flowers. After the flowering season it will be found that the plant has produced a new corm, which must be cared for in winter and reset in the spring. A number of small bulblets are formed about the main bulb. These may be used to advantage to produce new plants.

Gladsheim, in Scandinavian mythology, the most splendid palace in Asgard. The word means "house of gladness" or "region of joy." It is mentioned sometimes as the home of Odin, but Gladsheim contained, besides Odin's throne, a throne for each of the twelve Aesir or great gods. Odin's throne rose higher than any of the others. The great banquet hall of Gladsheim was called Valhalla. Here Odin gathered his warriors. That valiant men might not be lacking on the day of the last great battle, which must surely come, Odin sent forth his messengers, the Valkyrior, to every earthly battlefield to choose those who should be slain, that they might be brought to Valhalla. The word Valhalla means "hall of the slain."

Gladstone, William Ewart (1809-1898), an eminent British statesman and orator. He was born at Liverpool and died at Hawarden. He came of Scottish parentage. The original family name was Gledstanes, meaning hawk stones, having reference, no doubt, to a crag on which hawks built. Gladstone was educated at Eton and at Christ Church, Oxford. He was graduated in 1831 with the highest honors in classics and in mathematics, being what is known as a double first. In 1832 he entered Parliament, in which he held a seat almost continuously until his final retirement from public life in 1894. Among his associates were Peel, Palmerston, Disraeli, Bright, Cobden, Parnell, Bulwer, and Russell.

His name is one of the most prominent in the Victorian Age. A mere index list of the public measures with which his name was identified occupies over a column in Justin McCarthy's *History of Our Own Times,* while his sovereign, the queen, is accorded barely a fourth of that space.

Gladstone's ability as a debater gave him prominence while yet in college, and secured immediate recognition in the House of Commons. He was made a junior lord of the treasury in 1834. He was subsequently advanced from one cabinet position to another, and was four times prime minister. He was a Tory by birth and education. He entered Parliament as a member of the Conservative party, but changed his views and became the leader of the Liberals. He advocated and carried many measures that overturned the ancient order of affairs. Many measures were carried by the party of progress under his leadership. The duty on paper was abolished, because it was a tax on reading. In 1870 a system

of public schools, known as board schools, was established because it was felt that a part of the children were neglected by the parish schools. Formerly the government sold positions in the army to young men who were able to pay for them. Appointment on merit was substituted for the purchase of commissions. A system of civil reform was instituted whereby officeholders were retained by reason of merit, rather than because they were efficient party workers. In accordance with ancient law and customs, none but members of the Church of England might be granted degrees by the universities. This restriction was removed. Labor unions were legalized; that is to say, it was made lawful for laboring men to associate for the purpose of obtaining better wages or otherwise improving their condition.

Under Gladstone's leadership Great Britain was divided into parliamentary districts after the American fashion, and the right of voting was extended. In 1884 3,000,000, chiefly rural laborers, were granted the right of ballot by a single parliamentary act. Although for the greater part Catholic in faith, the property holders of Ireland were required to pay taxes in support of the Protestant church, that is, the Church of England. Gladstone secured the repeal of this measure. This act is known in history as the Disestablishment of the Irish Church. Provision was made whereby Irish tenants were enabled to borrow money from the general government to purchase the little farms on which they worked, and thus escape the ruinous rents exacted by absentee landlords. One of the latest measures in which Gladstone was interested was a government by home rule—a local parliament for Ireland. The measure passed the House of Commons but was killed in the House of Lords.

Gladstone was not a favorite with Queen Victoria. She felt, perhaps, that he was too willing to overturn ancient customs, too active a friend, possibly, of the interests of the common people; yet she treated him with respect and offered him, it is said, a seat in the House of Lords. Gladstone had very little regard, however, for the upper house. At one time when the lords delayed passing a reform bill he agreed to a proposition to appoint enough new Liberal peers to give that party a working majority in the House of Lords. It is needless to say that the House of Lords passed the bill rather than suffer such an inroad upon their ancient dignity.

Gladstone was a remarkable speaker. Although a quiet man, his face was massive and impressive. His voice was clear and melodious. His memory seemed never to fail him. He was able to refer to the details of proposed measures without the slightest hesitation. He had a fund of ready wit that charmed his supporters and caused even his opponents to listen with pleasure. He was a master of invective. He would begin a sentence in a low, pleasing key, gathering force as he advanced, then, rising slightly on his feet, and raising his arm, he would deliver a measured, resounding blow at his opponents that reminded one, not so much of Jove's thunderbolts, as of a blow with a flail or a sharp rap with a single-stick.

In spite of a busy life, the busiest, perhaps, in all England, Gladstone found time for authorship. Instead of writing on political questions, however, he chose such subjects as the *State in its Relation to the Church, Studies on Homer and the Homeric Age, The Vatican Decrees,* etc. He was a frequent writer for various magazines and reviews.

At the time of his retirement from Parliament he was hated heartily by the adherents of the established churches of England and Scotland. To his political adherents, however, the Liberals, he was ever the "Grand Old Man." His popularity in the United States is impaired slightly by the fact that, during our Civil War, he took the side, at first, of the Confederates. Without doubt he was influenced, in part at least, by the desire of obtaining cotton for the mills in which so many English workingmen were employed. His opponents called him a traitor, a trader, and a trickster.

See DISRAELI.

Glanders, an infectious disease of the horse. It is a bacterial disease caused by

a bacillus not different in appearance from that of consumption. The malady is marked by an offensive discharge, usually from one nostril, and a harsh, wiry feeling of the coat. Two stages are noted, one called by veterinarians the chronic, and the other the acute. A horse affected with glanders in the first form may live for years and do its work, but the disease is almost certain to pass in time into the other form, from which animals do not recover. Oddly enough, a horse with a mild form may communicate the germs of acute glanders to its healthy mates. The laws of most states require that an infected animal be killed and buried. Provision is sometimes made for partial compensation to the owner. It is considered dangerous to handle infected horses, as the germs have been taken into the human system causing distressful death.

Glasgow, the metropolis of Scotland. It ranks next to London in the United Kingdom. It is situated on both banks of the Clyde at the head of deep water navigation. In 1769 James Watt surveyed the river and found but two feet of water. By narrowing the channel and dredging, however, a passage 400 feet wide and 21 feet deep has been created. Large ships from all parts of the world lie at the wharves of Glasgow. Smaller ships for the coast trade crowd the channel. Little ships dart up and down the stream with passengers or loads of goods designed for shipment. The river is spanned by a number of bridges. Some consist of stone arches, others are of iron. There are two suspension bridges. Tunnels have been constructed beneath the river to accommodate a portion of the enormous traffic.

The city possesses a series of fine parks. The most celebrated, though not the most beautiful, is Glasgow Green, facing the river. The various greens and squares contain statues of Queen Victoria, James Watt, Robert Burns, Dr. Livingstone, Sir John Moore, Walter Scott, Wellington, etc.

There are a number of fine buildings, including the bank of Scotland, the Royal Exchange built in Corinthian style, the United Free Church College, the Stock Exchange, and immense railroad stations, but the most celebrated building is the old cathedral, dating from 1133. It is a stately edifice, now used as a Presbyterian church. It possesses a fine crypt with graceful arches. The crypt measures 125 feet in length. It is considered the masterpiece of Scottish architecture. It figures in Walter Scott's novel of *Rob Roy*. The University of Glasgow occupies a magnificent pile of new buildings on a commanding site near the city. Its library is especially rich in volumes and old manuscripts illuminated beautifully by the hands of industrious monks.

The city obtains its water supply from Loch Katrine thirty-four miles distant. When the system was ready for use Queen Victoria turned on the water in person. The supply is 50,000,000 gallons a day. The street railways are owned by the city. Fares are regulated according to distance. It costs but a cent for a short ride, though the cost of a long ride exceeds the five cent fare customary in the United States. American students of municipal affairs consider Glasgow one of the best governed cities in the world.

The early wealth of the city was derived from trade with France. Cargoes of herrings were exchanged for brandy and salt. An extensive trade was opened up later with the West Indies. The early merchant princes of the city were known as the tobacco lords. When cotton took the place largely of wool for clothing Glasgow became an important center of the cotton industry. Enormous quantities of raw material were imported, converted into cloth, then shipped abroad again.

Coal and iron are at hand in great abundance. Enormous smelters with their tall chimneys stand out against the horizon in every direction. Shipbuilding has long been an important industry. Glasgow is still the most noted shipbuilding center in the world. When British oak was exhausted, pine was obtained from Maine and Georgia. Large quantities of ship timber are still purchased in Scandinavia. Glasgow led off in the building of iron ships. Clyde-built steamers are noted the world over.

The population at the beginning of the present century was 760,423—one-fourth of all Scotland. In 1921 the population was returned at 1,034,069. Goods to the value of $70,000,000 are imported annually. The exports amount to about $92,000,000. The secret of Glasgow's prosperity is told in the following extract from a United States Consular Report:

Not a vessel entered the harbor during the year 1906 flying the flag of the United States. The records for six years past disclose the astonishing fact that while 1,130 loaded ships sailed from Glasgow to the United States, not one of them carried an American flag. The local market value of the goods carried on these vessels to the United States in the six years amounted to $37,016,949. This does not include an average annual passenger list of 25,000 persons. As the value of the importations from the United States into Glasgow exceeds the exports, the foreign vessels leaving this port carried freight valued at over $37,000,000 and returned with cargoes the estimated cost of which in America was no less than $50,000,000. Glasgow has 110 separate firms and corporations owning steam and sailing ships engaged in the foreign and coastwise trade. In some instances a single company owns as many as 30 vessels, the tonnage of many of these being over 8,000 tons. The number of local shipping offices and agents engaged in extending the foreign commerce is 569.

The practical benefits of a merchant marine, and how it has aided in the development of a new industry in Glasgow during the past fifteen years, until it has outstripped its older rivals in the United States, is shown in the case of a well-known sewing-machine company. Its capital is English and its active management is in the hands of able and experienced Americans. This plant was built in the suburbs of Glasgow fifteen years ago. To-day it gives employment to 11,000 people, and during the past year it manufactured 1,000,000 sewing machines. These machines were sold in Central and South America, on the Continent of Europe, and all over the Far East. They reached these desirable markets through the medium of Glasgow's merchant vessels. This was an advantage its rivals in the United States did not enjoy, and hence during these years have missed the sale of millions of machines. With equal shipping facilities—direct lines and cheap transportation—and having all the raw material in America, the Glasgow plant could not undersell the sewing-machine companies of the United States in the foreign markets of the world.

See CLYDE.

Glass, a well known hard, brittle, transparent material. The substances used in making glass vary considerably, but the essentials are three: first, silicon in the shape of pure, clean sand, crushed quartz, or flint; secondly, an alkali in the shape of a soda or a potash; and thirdly, lime in the form of chalk or limestone, or else one of the lead ores. It is not difficult to find materials quite satisfactory for beer bottles, pop bottles, and other articles that may be made of coarse or colored glass, but for clear white glass, it is important to use sand free from iron, lest it give a green or yellow tinge.

In the manufacture of window glass, the materials are mixed together in a crucible or furnace, and put over an intense flame, until they are melted together. After a thorough mixing and refining, the liquid is allowed to cool until it becomes pasty. The glassblower then dips one end of a long tube into the pot and gathers a lump of the sticky metal which he proceeds to blow into a huge bubble, just as a boy would blow a soap bubble. By twirling his tube, and by swinging it in a vertical direction like the spoke of a wagon wheel, he draws his bubble out into a large, long, hollow cylinder. If at any time his glass becomes too hard to shape, the workman thrusts it for a moment into a fiery furnace called a "glory hole." In order to have room to swing his pipe the blower stands on a plank laid across a deep pit. When the cylinder has taken the required form it is allowed to cool. The ends are opened and trimmed while yet plastic. The hardened cylinder is then slit along one side with a diamond and placed in an oven, slit uppermost. As the glass heats up the crack widens, and the cylinder opens up, settling finally on the floor of the oven in the shape of a flat sheet of glass. This sheet is then sent through an annealing furnace to harden. It is then laid on a table and cut into window panes of marketable sizes.

A glassblower needs to be a man of strong muscles and powerful lungs. He is expected to blow about eighteen pounds of metal into a cylinder about a yard long and a foot in diameter, much larger than an ordinary joint of stovepipe. A skillful blower can form a great variety of glass articles with his pipe and other tools. Heavy tumblers, delicate wine glasses,

lamp chimneys, and bottles are entirely within the limits of his art. A great many cheap glass articles are made of glass pressed into molds. An experienced eye can detect the difference readily. In cut glass the general form is given by blowing or pressing. The design is cut by workmen who hold the object against a swiftly revolving wheel of soft steel, copper, or sandstone, the cutting edge of which is fed with emery and water. The polishing is done on a wooden wheel fed with a polishing powder.

Plate glass is made in a different way. The liquid glass is poured out on a flat iron casting table as large as the pane is desired to be, and provided with adjustable rims around its edge, which are raised or lowered to give the desired degree of thickness. A long, heavy roller resting on the rim is passed back and forth to prevent any unevenness in the surface. After the glass has cooled and the plate has been annealed in a fiery furnace, a process which seems necessary to prevent glass from snapping apart without apparent excuse, the plate is fastened to a horizontal table and ground off by iron rubbers fed with sand until it has lost nearly half its thickness. The sheet is then polished with leather or felt buffers fed with fine emery powder and putty powder. Plate glass does not have as hard a surface as the blown and annealed window glass; but larger, heavier panes are possible. It is used chiefly for show windows and mirrors. Rough plate, unground, is used for large skylights. The heavy glass used for flooring is also cast in this way.

Colored glass is made by the addition of coloring material. The motley dark brown and black glassware lately on the market is made from iron slag. Green is produced by adding copperas or iron filings; yellow, by sulphur, charred horn, or silver; blue, by cobalt or copper; ruby, by copper or gold; milky glass, by tin or zinc.

An idle story runs that glass making was discovered by Phoenician sailors who found that the seashore became coated with glass beneath their campfires. Glass articles have been found in the excavations of Nineveh, made perhaps in Tyre and Sidon in the early days of trade by caravan. Glass beads have been found in Egyptian mummy cases, certainly 3,000 years old. Rome acquired the art of glass making from the Egyptians and carried it to Constantinople. Venetian glassblowers were long celebrated, and are noted still, for the beauty and delicacy of their glass work. At the present day Bohemian glass work leads in quality, fineness, and delicacy.

Pure glass is not acted upon by ordinary acids and chemicals. For this reason, workers in laboratories use test tubes, retorts, beakers, and thermometers of Bohemian glass almost exclusively. Extensive beds of sand suitable for glass are found near Aix-la-Chapelle, Germany, and Fontainebleau, France. Belgium, England, and Australia have excellent sand for the purpose. At present the glass sands of the United States are found chiefly in Berkshire County, Massachusetts, and in the Juanita Valley of Pennsylvania. Cheap, clean fuel of great heating power, free from smoke and soot, is found in Pennsylvania in the form of gas, oil, and coke, an advantage which has made Pittsburgh and vicinity the chief glass-making center of the United States. There are extensive glass works at New Albany and Alexandria, Indiana. Natural gas is used for fuel. The largest gas furnace in the world is said to be in use at the latter city. It accommodates fifty pots or crucibles, and gives employment to 750 men.

Mr. Irving Colburn of Franklin, Pennsylvania, has expended $200,000 in perfecting a glass-rolling machine to take the place of the gatherers, blowers, and flatteners. By means of this machine, put into operation in 1908, one man and two boys are able to accomplish the work of thirteen skilled mechanics. The device is 120 feet long. The bystander sees the cooling surface of a molten tank of glass drawn off between rollers. A sheet of glass of the required width and thickness may be seen traveling like a sheet of paper and falling continuously on a table at the rear where it is cut into six-foot lengths on a rotary cutting table.

According to the last census the statistics of glass making in the United States are:

ART GLASS AND PORCELAIN

1. Porcelain Vase, Berlin
2. Porcelain Plate
3. Parisian Stoneware
4. Venetian Glass
5. Wedgewood Pitcher
6. Vase, Paris
7. Persian Plate
8. London Tumbler
9. Berlin Vase
10. French Vases
11. Vase, Paris
12. Coffee Cup
13. Porcelain Flask
14. Chinese Vase
15. Porcelain Dish, Japan
16. Fayence Vase

Glass factories	371
Capital employed	$215,680,430
Number of wage earners	77,520
Annual wages	$ 87,526,625
Cost of materials	$ 90,780,124
Annual production, value	$261,884,080

Up to April, 1917, very little optical glass was made in the United States. This is a fine quality of glass, used for special purposes requiring scientific precision in its manufacture. When the United States entered the World War, large quantities of optical glass were urgently needed for periscopes, gun sights, range-finders, measuring instruments, etc., and American glass factories were called upon to meet this new demand on their skill and facilites. For the modern range-finder, glass is required which will make the instrument efficient at a range of 20,000 yards, instead of the 5,000 yards which sufficed before the war; while twenty different pieces of glass are needed for the periscope of a submarine. Thus the problem of manufacture was a difficult one, but the government required immediately about 2,000 pounds a day of fine optical glass, of about sixteen different kinds—and the American manufacturer rose to the occasion. Prior to the war practically all the optical glass used in the United States had been imported from Europe.

In optical glassmaking, the term *flint* is applied to a glass containing lead, as the density produced by a lead mixture causes high refractive power. The term *crown* is applied to a glass of low refractive power, composed of a lime silicate or an admixture of lime silicate. The fusion of materials, or the melting process for optical glass, and also the entire finishing process, requires the utmost care and patience. Materials of the highest purity are melted in pots about 40 inches in diameter and 40 inches high, lined with a glaze of broken glass. These pots having been very slowly heated for four or five days, the batch of materials is put in a little at a time, and stirred with a fireclay roller. Glasses for special use must be of special composition, and various substances, such as boric acid, barium, and phosphate compounds must be added to the usual ingredients.

The molten mass is kept at an intense heat for six or eight hours or more, and constantly stirred, to allow all the bubbles of gas to escape. The temperature must be maintained at just the right degree, or the batch of glass will be spoiled for optical purposes. After fusion is completed the pot of glass is allowed to cool; first, rapidly, then slowly. The pot is then broken, and the yield of usable glass usually runs from 20 per cent up, the remainder being rejected. Perfect portions of the glass are placed in disk-shaped clay molds and remelted to form glass disks. The final process is annealing, which also is performed slowly and requires the greatest care.

During the war, about half a dozen American manufacturers, with the cooperation of the United States Bureau of Standards, succeeded in making enough optical glass to supply the needs of the government and leave a little more for export to allied countries. Thus an American optical glass industry has been established which gives promise of permanence and valuable development in the future.

Wire glass, in which wire is incorporated in sheets and panes of glass, is a recent product of the glass-making industry which is now extensively used by builders. It is especially useful in large glass-roofed structures, like railway stations, where a single wide-arched roof must span an enormous area and also light the interior; but wire glass is also used nowadays for ordinary windows in exposed position, as a precaution against fire and accident. The iron wire netting imbedded in the glass only melts at a higher temperature than the glass itself; thus in case of fire, it holds the glass together and retains its shape even after the glass has become softened by the heat. It forms an admirable material for elevator-shaft casings, doors, etc., and is often prescribed by building regulations.

Glass in the molten state may be drawn into threads and makes a transparent mineral silk capable of being woven into cloth, or other fabrics, sometimes with a warp of silk. Women's dresses have been made from glass fabric, also collars, neckties,

brushes, lamp wicks, etc. See MIRROR; WINDOW; SAND.

Glass-Snake, a peculiar lizard about eighteen inches long. It is found in the Southern States. It has a yellowish green body, with a smooth, shining skin. The glass-snake is perfectly harmless. It takes its name from the peculiarity that, if struck with a stick, its brittle tail flies into several pieces. The slow worm and blind worm of Europe are smaller relatives of this animal. The brown swift or pine lizard of the Southern States is also related. See LIZARD.

Glean, to gather fallen heads of wheat or other grain. Where land is dear, fields small, and labor cheap, women and children go over the fields at harvest time, gathering up scattered grain. Now that breadstuffs are raised and harvested largely by machinery, and transportation is less expensive than formerly, even the poor do better to work for wages and buy bread. There is now very little gleaning. Among the Hebrews the owner of a field was forbidden to glean. Scattered grain was left for the poor. Ruth, it may be remembered, went gleaning in the fields of Boaz, her husband's rich kinsman.

In that calm Syrian afternoon, memory, a pensive Ruth, went gleaning the silent fields of childhood, and found the scattered grain still golden, and the morning sunlight fresh and fair.—Curtis.

Glebe, glēb, in England and Scotland, land allotted for the free use of the pastor of a church. Traditionally the glebe is large enough to afford pasturage for a cow and to raise such vegetables and fruit as may be needed by a family. Ordinarily it comprises about four acres of desirable land adjacent to the manse or near the church. Sometimes it lies in a distant part of the parish. In case the minister does not desire to cultivate it himself, he is entitled to let it for rent, but he has no authority to sell. The legal right to a glebe belongs, of course, only to pastors in the established churches. See PRESBYTERIANS.

Gleeman, a strolling minstrel or musician. See MINSTREL.

Glencoe, a valley in Argyllshire, Scotland. It opens westward upon Loch Leven. It is about twelve miles in length. It is celebrated for romantic, even sublime, scenery. It is noted in history as the scene of the Massacre of Glencoe. In 1691 all Highlanders were commanded to take the oath of allegiance to William and Mary on or before the thirty-first of December. The Macdonalds of Glencoe, for some reason, delayed making their allegiance until the sixth of January following. Their enemies, the Campbells, led by clan hatred, procured an edict for the extermination of the Macdonalds. One hundred twenty soldiers under Captain Campbell visited the glen. Under pretense of friendship they lulled the suspicions of the inhabitants and remained for twelve days, enjoying their hospitality. The night of the thirteenth of February the Campbells arose after the manner of savages and began massacring the inhabitants of the valley. Thirty-eight men, women, and children were put to death, but one hundred and fifty were able to escape.

Glens Falls, N. Y., is picturesquely situated on the Hudson River and the Champlain Canal, 50 miles north of Troy. Throughout the French and Indian War and the Revolutionary War a fortified post stood just outside the limits of the present city. The Hudson River at this point has a descent, with falls and rapids, of about 60 feet. In his *Last of the Mohicans,* Cooper celebrated these falls and a cave, which can be seen only when the water is low, lying under the limestone formation at this point. At the falls, and deriving power from them are some of the largest and most costly paper mills in the world. Important among the city's manufactures are wrapping paper, pulp, wall-paper, collars, shirts and shirt-waists, paper boxes and cigars. The city contains the St. Mary's and the Glens Falls academies, Crandall Free Libary and fine public schools. Population in 1920, 16,591.

Globe, in mathematics, a sphere; **in geography,** a spherical map. A globe having a map of the earth on the surface is called a terrestrial globe; one having a map of the heavens, a celestial globe. The earliest globe known dates from the eleventh century and is preserved in the national libra-

ry at Paris. It was made of copper by the Arabs and is engraved with a map of the heavens. The oldest terrestrial globe with which we are acquainted was made by a geographer named Behaim about 1491-3. He had traveled as far westward as the Azores. It is still shown to visitors in the house of his ancestors at Nuremberg. It is twenty-one inches in diameter. It is made of pasteboard covered with parchment. It shows the equator, the two tropics, the polar circles, and gives such geographical information as was known to Marco Polo and Mandeville. It is especially interesting as representing the geographical knowledge of the world prior to the discoveries of Columbus. It shows that the spherical shape of the world was well understood, and that Columbus was not alone in his idea that by sailing westward he was bound to reach land sooner or later.

A number of globes made soon after Columbus' first voyage are in existence. One preserved in the public library of the old French town of Nancy is considered a curiosity. It is about six inches in diameter and is made of chased silver. The land portions are represented by gilding, the waters by azure blue enamel. It dates from 1532. It still represents the New World as an extension of Asia. A globe of the year 1520 preserved in the town library of Nuremberg merits mention. It represents North America as a large island and South America as another. It is noted as the first geographical representation on which the word America appears. The name is applied to Brazil. It was some time before the term was applied to the western continent.

Gerhard Mercator, a map maker of Louvain, is regarded usually as the earliest modern globe maker. His globes were sold at Nuremberg, at the book fairs of Frankfurt-on-the-Main, and in England. They were about two feet high and were mounted on stands with meridians, horizons, etc. One pair is still preserved in the royal library at Brussels; another in the court library at Vienna.

A globe made apparently in Rome, bearing the date of 1542, is preserved in the museum of the New York Historical Society. The Academy of Science at St. Petersburg possesses a number of noteworthy globes. One of these is a hollow sphere eleven feet in diameter. It contains a seat and table for twelve persons. It was manufactured from designs found among the papers of Tycho Brahe. The outside is a terrestrial globe; the interior is furnished with a map of the heavens. The stars are represented by gilt-headed nails of various sizes. A pair of globes twelve feet in diameter, made in Italy in 1683, is preserved in the national library at Paris. A Frenchman by the name of Colonel Langlois exhibited a globe 121 feet in diameter in Paris in 1825.

School globes are made generally of metal, plaster, wood, or pasteboard. Whatever the material may be, they are covered, usually, with paper of high finish, on which the map has been printed. Of late some effort has been made to represent physical features. In this, however, there is the danger to which all relief maps are subject, namely, that of exaggerating altitudes. The loftiest mountain chain in the world, when represented on a school globe or map, should not exceed the thickness of a sheet of paper in height.

Globes are to be preferred to flat maps for school work. They give a much more accurate idea of rivers, for instance. With an accurate globe held in various positions, there is no danger that a pupil may get the notion that the Nile, the Rhine, and the St. Lawrence rivers run up hill.

See GEOGRAPHY.

Globe Theater, a theater in Maiden Lane, London, erected in 1599, in which many of Shakespeare's plays were acted for the first time. It was a high, eight-sided, wooden affair, with a stage but without scenery. It was covered with a roof of straw thatch. In the prologue of Henry V, Shakespeare refers to the building as "this wooden O." It accommodated 2,000 spectators, and was uncommonly large for the time. Seats varied in price from two pence to half a crown—from four to sixty cents. Shakespeare was allowed a salary and a share of the profits, amounting in all to $2,500 a year—equivalent to an income of four times that amount at the present day. June 29, 1613, during

the performance of the play of Henry VIII with immense pomp, cannon were fired by way of welcome at the entry of the supposed Henry. "Some of the paper or other stuff wherewith one of them was stopped did light on the thatch, where, being thought at first but an idle smoak, and their eyes more attentive to the show, it kindled inwardly and ran round like a train, consuming within less than an hour the whole house to the ground." The chronicler of the event deemed it worth while to record as the exciting incident of the occasion, that "one man had his breeches set on fire," but that "a provident wit put it out with bottled ale." The theater was rebuilt but the new edifice never acquired the fame of that in which Shakespeare scored triumph after triumph. It was pulled down finally. The site is occupied now by tenements. Welsh gives an interesting description of the Globe Theater in Shakespeare's time:

> On the banks of the Thames rises the principal theatre, the Globe, a hexagonal tower, surrounded by a muddy ditch, surmounted by a red flag, and roofed by the sky, retaining in its form and arrangements traces of the old model—the inn-yard. Into the pit, the sun shines and the rain falls without let or hindrance; but their bodies are inured to exposure, and they don't trouble themselves about it. The poor are there, as well as the rich; for they have sixpenny, twopenny, and even penny seats. With the actors, on the rush-strewn stage, which is covered with thatch, are the elegant and the dainty, who pay a shilling for admittance. For an extra shilling, they can have a stool. If stools or benches are lacking, they stretch themselves on the floor. They smoke, drink, swear, insult the pit, who pay them back in kind, and fling apples at them in the bargain. Over them, in a lofty gallery, are the musicians. Below, in the circle of the pit, while they wait for the piece, cards are shuffled, oaths resound, ale-pots clatter, blows are exchanged. When the beer takes effect, there is a receptacle for general use. When the fumes rise, they cry, "Burn the juniper!" They are amusing themselves after their fashion. At one o'clock—Sundays included—the flag is hoisted, to announce the hour of the performance. When the trumpet sounds, a figure in a long black velvet cloak comes forward to recite the prologue. Then the play begins, the players in masks and wigs, and attired in the richest dress of the day. If the *house* are not suited, they hiss, whistle, crow, yell, perhaps fall upon the actors and turn the theatre upside down. The appointments are barbarous, but imaginations are fervid and supply what is wanting. Wooden imitations of animals, towers, forests, etc., are the scenery. A bed suggests a bed-room. A rough table, with drinking vessels, replaces a dingy throne and turns a palace into a tavern. A young man, just shaven, stands for a queen. A scroll in big letters, hung out in view of the spectators informs them that they are in London, Athens, or Paris. Three combatants on a side determine the fate of an empire. Says Sir Philip Sidney: "You shall have Asia of the one side, and Africke of the other. and so many other under-kingdoms, that the Plaier when hee comes in must ever begin with telling where hee is, or else the tale will not be conceived. Now shall you have three Ladies walke to gather flowers, and then wee must beleeve the stage to be a garden. By and by wee heare newes of shipwracke in the same place, then wee are to blame if we accept it not for a rocke; . . . while in the meane time two armies flie in, represented with foure swordes and bucklers, and then what hard heart will not receive it for a pitched field?"

See SHAKESPEARE; THEATER; DRAMA; TRAGEDY; COMEDY; ACT.

Globigerina, glō-bĭj-ē-rī′nȧ, a minute sea animal. It is something like an amoeba in structure, yet it is protected by a shell. It lives in myriads at the surface of the sea. At death the shell, which is as small as the finest dust—so small that it cannot be seen without a microscope—settles slowly to the bottom of the sea, where it forms deep beds of ooze or fine mud. The soundings made by the Challenger expedition brought up specimens of ooze from great depths. The chalk cliffs of England and France consist largely of these shells. Enormous thicknesses of rocks appear to be composed of similar oozes hardened by heat and pressure. Geologists assert that if the world last long enough, the deposits of this sediment, now collecting so slowly on the floors of the oceans, may one day be hardened rock crumpled up into mountain folds of new continents.

Gloria or **Gloria Silk,** a twill-woven silk and wool fabric. It is used principally for covering umbrellas. Under the names of lansdowne, fayetta, and laburnum, the same fabric is used for women's gowns, waists, and suits. The best gloria has a warp of silk which has been freed entirely from the natural gum which covers the product of the silkworm. Sometimes the silk is used without being sub-

mitted to the processes which remove this gum. Such fabrics have less luster, do not retain dyes permanently, and do not wear as well as those made from the properly prepared silk. The weft of gloria is of fine worsted yarn. In weaving, the warp is brought to the surface as much as possible to give the sheen of silk to the finished fabric.

Gloucester, Mass., is a port of entry 32 miles northeast of Boston, on Massachusetts Bay and near the extremity of Cape Ann. The city is one of the most important fishing ports and fish markets in the world. It is estimated that 500 vessels and 6,000 men are engaged in the trade. Cod, herring, halibut, haddock and mackeral are the principal catches. It was at Gloucester that the first of the type of sailing vessels known as "schooners" was launched, in 1754. Almost the entire life of the city is in some way connected with the fishing industry. There are extensive shipyards, and manufactories producing sails, nets, fish-glue, oil, hardware, shoes and twine. The city contains the Home for Aged Fishermen, the Magnolia, the Sawyer and the pubilc free libraries, and good schools. Tourists, and especially artists, are fond of Gloucester. The coast at this point is naked and sterile, jagged and bold. Near the city is the massive sunken rock called Norman's Woe that is said to have inspired Longfellow's poem *The Wreck of the Hesperus.* The population was 22,947 in 1920.

Glove, a covering for the hand. It is distinguished from a mitten by having a separate inclosure for each finger. If we may credit Zenophon, the writer of the *Anabasis,* the Greeks appear to have sneered at the Persian soldiers for wearing gloves to keep their hands warm. However much the ancients may have scorned to cover their hands in the days of simplicity, it is known that gloves were worn in the later days of the Roman Empire. Richly embroidered gloves were a fashionable article of attire among gallants in the day when Walter Raleigh spread his rich cloak over the mud for Queen Elizabeth to walk on. A mailed glove formed of interwoven steel links was a part of the knight's armor. To fling a glove at the feet of another was a challenge to mortal combat. To send a mailed gauntlet to a court or camp was a declaration of war.

Modern glovemaking is an important industry. In the world of trade knit gloves, whether of cotton, silk, or other fiber, are classed with hosiery. Glovemaking from woven or felted cloth, cut by pattern and afterward stitched together, is a separate branch of industry. Driving gloves and sportsmen's gloves are made of horsehide, buckskin, pigskin; also kid and calf, or any pliable, durable leather. Kid gloves are supposed to be made from the skins of young goats, but, as a matter of fact, the cheaper grades are made of sheepskin shaved thin.

Glovemaking in America was established shortly before the Revolutionary War. Some Scotch glovemaking families were colonized in Fulton County, New York, by Sir William Johnson, the great manager of the Mohawk Indians. They called their village Perth, and began at once the making of heavy buckskin and other gloves for farmers and frontiersmen. Thread, needles, and patterns they brought with them. From this small beginning a large industry grew up in Perth and vicinity. In 1825 a lumber wagon laden with gloves was dispatched to the Boston market, making the trip in less than two months,—a notable event in the trade.

At the present time there are many establishments in the United States that make gloves. Fulton County, N. Y., produces a large number of the total output. The chief centers in Canada for glove-making are Ontario and Quebec.

Gloversville, N. Y., is situated 54 miles northwest of Albany, on the Fonda, Johnstown & Gloversville Railroad. This city is noted as one of the most important centers of the leather glove and mitten industry in the United States. About 1760, a number of Perthshire families were settled here by Sir William Johnson, and it is thought that the industry that is the chief support of the city originated among these colonists. The city contains also factories for the production of tanned leather, glove and shoe leather, leather

pocketbooks and leather novelties. There is a Carnegie library. The municipality owns and operates the water works. The population in 1920 was 22,075.

Glowworm, a beetle famous for emitting light. The common glowworm of English literature is the wingless and, therefore, wormlike female of a beetle closely related to our firefly. This insect is about half an inch long, black, with dusky reddish legs and a marginal line of the same color. Like our firefly, the glowworm is nocturnal. The last segments of its body emit a steady, strong, soft, bluish gleam. As the light-giving female has no wings, it is easily caught. A couplet from Hamlet gives a glimpse of the hours Shakespeare kept and of his keen observation:

> The glowworm shows the matin to be near,
> And 'gins to pale his uneffectual fire.

Evidently the poet did not know that it is the female that glows. "The glowworm," says Mr. Edison, "can do something we have not learned to do. It can give light without heat." For a further discussion see FIREFLY.

Glub-dub-drib. A land visited by Captain Lemuel Gulliver in which only musicians dwelt. See GULLIVER'S TRAVELS.

Glucinum, glū-sī′nŭm, a metallic element. Its salts have a sweet or glucose taste, whence the name. It belongs to the same group of metals as aluminum. It has the appearance of steel. It is very light, having a specific gravity of 2.1. It is of interest chiefly to chemists. It makes excellent pen points, but most so-called glucinum pens are mere steel imitations. Glucinum was obtained in a metallic form from beryl in 1828. It is sometimes called beryllium.

Glucose, glū′kōs, the chemical name of several sugars, less sweet than cane sugar. Commercially speaking, glucose is a sirup, lacking in sweetness, produced by the action of sulphuric acid on the starch of grain or potatoes. Glucose is the base of most cheap sirups. It is not poisonous nor in any way unwholesome. The chief prejudice against glucose arises from its extensive use as an adulterant or substitute for the higher priced maple, cane, and beet products. Glucose is distributed widely in nature. It is a constituent of grapes, cherries, plums, figs, and many other sweet fruits. The sugary sweet excretion on raisins is glucose. It is a constituent of honey. It occurs also in living animal tissues, and in the intestine, hepatic veins, and liver tissue of human beings. In the disease known as diabetes it exists in large quantities in the urine, and may be found in all fluids of the body. See SUGAR.

Glue, an adhesive substance obtained from the refuse of tanneries and packing houses. Roughly speaking, glue is obtained from a mass of fish scale or of horn, hoof, bone, sinew, and hide by first cleaning the pieces with lime and then boiling or steaming them for a considerable length of time over a false bottom or gate which permits the glue to drain off as it is released from the animal tissue. As the glue runs away it is caught, cooled, and, when "set," it is cut into cakes and sliced into shavings which are dried thoroughly and placed on the market. Glue factories are near neighbors to the packing houses of the corn belt and to the salmon canneries of the Pacific coast.

Glue is used chiefly by carpenters and cabinetmakers, and by sash and door factories in gluing pieces of wood together. Doors are made frequently with a veneer of hard wood on one side and a veneer of soft wood on the other. Two boards glued together under strong pressure are likely to split elsewhere before the glue will give way. The tops of tables, school desks, seats of wooden chairs, and most wide woodwork are made of narrow pieces glued together under strong pressure. Carpenters soften glue for use in a glue-pot. An inner pot containing the glue hangs in an outer pot containing water, so that the glue receives a slow, constant heat.

Glue is used by silk makers and in the manufacture of rigid linings to give a required degree of stiffness. It is used also by paperhangers to "size" or prepare walls for the reception of paper.

Mucilage is more often prepared from vegetable substances. An excellent article, none better, may be made from gum arabic, four ounces; honey, one and one-half

ounces; and water, one pint.

The earliest glue factory in America was established by Peter Cooper in Brooklyn in 1837. In 1919 there were 62 glue factories in the United States, employing 4,264 wage-earners, with a product valued at $32,134,067.

See PACKING HOUSE; GUM; GELATINE; ISINGLASS.

Gluten, a grayish, elastic, sticky substance found abundantly in the white of an egg, in grains, and in lean meat, etc. As a food it builds muscle. There are about eight pounds of gluten in one hundred pounds of wheat flour. It is the elastic gluten of wheat dough that enables the gas formed by yeast to make bubbles and leaven the dough. The gummy substance obtained by chewing a mouthful of wheat is nearly all gluten. The gluten of sound wheat gives flour and bread a slightly yellowish tinge, but it is not accountable for dark bread. Quite a controversy has arisen as to whether it is legitimate to whiten flour by "bleaching." See BREAD.

Glutton. See WOLVERINE.

Glycerin, glĭs′er-ĭn, a transparent, colorless liquid with the sweet taste and appearance of a sirup. Specific gravity 1.27. It is obtained from beef and other fats, notably palm oil, by the action of superheated steam. Commercially it is a by-product in the manufacture of stearin candles. It consists of carbon, hydrogen, and oxygen, which, it may be remembered, is also the composition of alcohol. It mixes well with water and cannot be fermented. It freezes, but not readily, into white crystals. It is used in medicine to soften and soothe a sore throat, for instance. Glycerin salves, soaps, and cosmetics are excellent toilet articles, especially for chapped hands, rough face, or sores. As a salve it is particularly excellent. The reason is a simple one. Instead of drying up, glycerin attracts moisture from the air. Like alcohol and sirup, glycerin is fatal to the growth of bacteria, and may be used as a preservative for animal and plant substances. It is an important part of the explosive nitroglycerin. It is also used in the preparation of mucilage, in sizing paper, and in many manufactures. Glycerin is used as a remedy for nervous diseases and neuralgia. In order to obviate the objection to alcoholic medicines many remedies are compounded with glycerin.

Gna. See FRIGGA.

Gnat, năt, a small two-winged insect. The distinction between flies, gnats, and midges is not clear. One of the best known species is the punkie of the northern woods. It is so small that the Indians gave it the name of "no-see-um." It penetrates the finest mosquito bar and is a great nuisance to the camper and hunter. Fortunately it is active during the daytime only. Certain species infest the eyes of deer, wolves, and other wild animals, even turkeys, almost blinding them. See FLY.

Gneiss, nīs, a rock closely related to granite. Unlike granite, however, it is formed in distinct layers which constitutes its most noticeable characteristic. The two kinds of rock are found close together usually, sometimes in alternating layers. Both are composed largely of silica. Many varieties of gneiss are as valuable as granite for building purposes.

Gnome. See FAIRY.

Gnu, nū, the Hottentot name of a peculiar antelope of South Africa. The Boers gave it the name of wildebeest. The head of both sexes is armed with two enormous horns which curve downward, forward, and upward in front of its face. A long flowing tail and a crest-like mane and a zebra-like body have given it the name of "horned horse." It has cloven hoofs, however, and chews the cud, like other animals of its kind; yet it is said that a herd seen at a distance flying over the plain can be distinguished with difficulty from wild zebras which inhabit the same locality. The flesh is palatable. The gnu kept company with the zebra and giraffe. Like them it is now to be found only in remote localties. There are two species. See ANTELOPE; ZEBRA.

Goat, a hardy, horned animal, closely related to the sheep. The various domestic goats are thought to be descended from the wild goat of Persia. Goats are favorites with the inhabitants of rocky, precipitous countries. The agile, sprightly,

playful goat can make a living on scanty shrubs and coarse grasses where a sheep would not fare well. Goat's milk is considered healthful and nutritious. In many oriental cities the milkman drives his herd along the street and milks his goats at the customer's door. The flesh is valuable for food. The hair is spun and woven into clothing, and the hide makes famous leather. The male or he-goat is known colloquially as a "billy goat." His horns and beard give him quite a reverend appearance. The female is known as a "nanny goat," and the young, usually two in number, are called kids.

The Cashmere goat of northern India and the Angora goat are famous for their long, silky hair. Mohair is an Arabic term applied to the hair of the Angora goat as well as to a kind of fine cloth made of goat's hair. Wool and cotton dress goods made in imitation of the genuine article are often called mohair. The term is closely akin to moire, a French name of watered silk.

On account of their brush-eating propensities, goats are especially valuable in clearing up wild land, but, generally speaking, they are less profitable than sheep and are not raised extensively in America. The goat is an animal of endurance. A four-goat team was driven from Hastings, Nebraska, to Portland, Oregon, and thence to San Diego, California,—a distance of 4,000 miles—traveling an average of fifteen miles a day.

The agricultural census of 1920 gives 3,458,925 as the total number of goats on farms in the United States. Ten years previously there were 2,915,125 goats. During this period, therefore, the increase was slightly more than a half million. Angora goats are kept in the United States for the fine fleeces of the young, and have little value otherwise. Almost all the trade in goats is carried on at Kansas City.

There is an extensive trade in the skins of Angora goats. Thousands of them are brought to this country yearly from Turkey and the Cape of Good Hope. Domestic skins are also on the market. Angora skins are worth from 35 cents to $3.50. They are easily dyed and make handsome rugs and robes.

In America the goat is not considered seriously. The country would get on quite as well, perhaps, without goats; but in a large part of the world, particularly in the countries surrounding the Mediterranean, the goat takes the place of sheep, hog, and cow. The inhabitants are dependent on the goat for wool, meat, milk, and leather.

From a recent *Year Book* of the United States Department of Agriculture we learn that the number of goats in the world is approximately as follows:

Europe	21,197,000
Asia	40,000,000
Australia	124,000
Africa	20,296,000
South America	5,800,000
North America	6,296,000
Total	93,713,000

Goatsucker, an Old World bird of the whip-poor-will family. It breeds in temperate Europe and flies to the south of the Mediterranean in winter. Like its American relative, it takes insects chiefly on the wing at nightfall. The name comes from an opinion long entertained that this bird drew the milk of goats during the night. Other popular names in England are night-jar, fern-owl, churn-owl, and moth-hunter. See WHIP-POOR-WILL; NIGHTHAWK.

Gobi, gō′bē, a vast stretch of desert in central Asia. It was at one time, no doubt, the bed of an inland sea. The ancient coast line may still be traced. It still receives a number of streams whose waters sink finally beneath the sand. The largest lose themselves in the sand or empty into salt lakes. The more fertile parts of the Gobi Desert are inhabited by pastoral people with their flocks. Caravan routes leading from China across the Gobi westward to Russia are still important routes of commerce. The Russians, who are great tea drinkers, will have no other tea except that which has been brought by caravan. They claim that a sea journey ruins the quality of tea. Marco Polo, who visited this district, wrote as follows: "You ride some five days through the sands, finding none but bad and bitter waters; then you come to a city at the edge of the desert." The actual dimensions are

Alpine ibex.

Wild goat, ancestor of domestic goat.

Asiatic goat, ancestor of Angora.

GOATS.

Angora goat.

about 1,800 miles from east to west, and 400 from north to south. The general surface is about 4,000 feet above sea level. It is largely composed of hills and valleys of sand. See DESERT.

God. See THEISM.

God Save the King (or Queen), the English national anthem. The authorship of both words and music is credited usually to Henry Carey. The story is that he was aided in composing the music by Dr. Thornton of Bath,. some say by Christopher Smith, Handel's clerk. The song was published first in *Gentleman's Magazine* in 1745 in honor of George II. The music, according to another account, was composed by Anthony Young, an organist in London. Still another story is to the effect that the song was written originally for King James II, and read "God Save Great James our King," and that after the abdication of James, it was sung no more until 1740, when it was revived for King George. The tune was adopted in France in 1776. The national songs of Denmark, Prussia, and Germany are set to this air. It is found in Beethoven's *National Symphony* and in more than one of Weber's compositions. Our own *America,* written in 1843 by Samuel Francis Smith, is sung to the same tune.

Godiva, Lady, in British legend, the wife of the Earl of Coventry. When the mothers of the town came to Godiva and represented that their taxes were so oppressive that their children were without bread, and must die, she went to her grim lord Leofric, among his hounds and followers, and begged that the taxes might be remitted. He twitted her on her want of sincere interest in such trash, and when she insisted that she would do much, even to the laying down of her life for breadless children, he told her that if she would ride naked through the town he would remit the tax. She caused a proclamation to be made, so runs the story, that all the inhabitants should shut themselves up within their houses and not dare to look out. Then clothed only in her long hair, which reached to her knees, she rode the length of the main street on her palfrey and returned. Only one person ventured to look out, but he was struck with immediate blindness. He has since been called "Peeping Tom of Coventry." The earl was obliged to keep his word. Taxes were remitted; children were fed. The legend was kept alive for many a century by a yearly pageant or procession. Tennyson has told the story well in his poem of Godiva. See COVENTRY.

Then she rode back, clothed on with chastity:
And one low churl, compact of thankless earth,
The fatal byword of all years to come,
Boring a little auger-hole in fear,
Peep'd—but his eyes, before they had their will,
Were shrivell'd into darkness in his head,
And dropt before him. So the Powers who wait
On noble needs, cancell'd a sense misused;
And she, that knew not, pass'd; and all at once,
With twelve great shocks of sound, the shameless noon
Was clash'd and hammer'd from a hundred towers,
One after one; but even then she gain'd
Her bower; whence reissuing, robed and crown'd
To meet her lord, she took the tax away
And built herself an everlasting name.

God's Penny, a penny given and accepted to bind a bargain. An old English custom. Under our common law inherited from England, a bargain may be enforced by either party if the buyer has paid a part of the purchase price. A bargain may also be held valid if the buyer has accepted any part of the property.

God's Truce, See TRUCE OF GOD; FIRST LAW.

Godwin, Mary. See SHELLEY.

Goethals, go′ thals, **George Washington,** (1858——), an American civil and military engineer, renowned as the builder of the Panama Canal, was born in Brooklyn, N. Y., and educated at the United States Military Academy at West Point. He was appointed second lieutenant of engineers in 1880, and in nine years rose to the rank of colonel in the engineer corps. During the Spanish-American War, he was chief of engineers of United States Volunteers. In 1907 President Roosevelt appointed him chairman and chief engineer of the commission to complete the Panama Canal. His engineering skill and administrative ability brought this great enterprise to completion several months before the time scheduled. In 1914, he was appointed the first civil governor of the Panama Ca-

nal Zone, and in 1915 he was made a major-general by special act of Congress in recognition of his work at Panama. In October, 1915, he was appointed chairman of a commission to investigate the workings of the Adamson Railroad Law. After the United States had entered the war, General Goethals was asked to supervise the construction of a large merchant marine, but, owing to a disagreement with his associates, he soon resigned.

Goethe, gē′ teh, **Johann Wolfgang,** a celebrated German poet. He was born at Frankfurt-on-the-Main August 28, 1749. He died at Weimar March 22, 1832. His father held the position of Imperial Councilor, and was a man of influence. His mother was a woman of good family. Her father had been chief magistrate of the city. The Goethe house, in which the poet was born, still stands. Painting, music, and literature were subjects of conversation in this cultured home. Goethe was a precocious boy, able to write German, French, Italian, Latin, and Greek when he was eight years old. He was fond of music and drawing, devoting considerable time to both pursuits, but without any marked degree of success in either.

During the wars between France and Frederick the Great, Frankfurt was full of French soldiers. The theaters and other places of amusement were controlled by French officers. Frenchmen of culture were welcome in the Goethe house. Our young boy, afterward destined to become a thorough advocate of German models in literature, came much under their influence. He grew up, however, fond of gaiety and a favorite in society. His early manhood, to say the least, like that of Byron, Burns, and Moore, was marred by unfortunate attachments. In 1765 he was sent to Leipsic to study law. In order that he might return to Frankfurt fitted for an official position, his professors endeavored to interest him in legal studies, but he attended lectures on literature instead. He was interested also in medicine, in botany, and particularly in theatricals. He acted several parts and wrote a number of plays, the characters in which were usually weak or immoral, or both. He came under the teaching of several men of importance, including Wieland, Winckelmann and Lessing, but did not remain to take his degree.

He returned home in poor health and found his old home circles uncongenial. In 1770 he was sent to the University of Strasburg to continue his studies. Here he amused himself with the study of Gothic architecture as illustrated in the cathedral of that city, took dancing lessons, learned to play on the violin, made the acquaintance of Herder, and broke the heart of Frederica Brion, yet managed to take his degree as doctor of law.

Goethe's efforts at self discipline are interesting. Believing that he was over sensitive, he obliged himself to pay frequent visits to the dissecting room. Rebelling at a giddiness which overcame him when on high places, he would climb to the summit of the Strasburg spire and remain standing sometimes for long intervals on a narrow ledge. The years immediately following his university career are a medley of law courts, love intrigues, and of literary successes. He wrote a tragedy called *Götz von Berlichingen* and *The Sorrows of Young Werther.* The latter is the story of a lovesick youth whose emotional experiences are described elaborately and who finally shoots himself in despair. Its sentimentality is so extravagant as to be ridiculous. On its appearance, however, it was one of the great literary events of the time. Hosmer says, "Nothing ever hit more precisely the taste of an age. It was read by high and low; it spread to foreign lands, even to the confines of the earth; it was the favorite of chambermaids; Napoleon took it with him to Egypt, and read it seven times. At one step the youth of twenty-five had become the favorite writer of Europe."

In 1775 Goethe accepted an invitation from Duke Charles Augustus, a patron of literature, to settle at Weimar. Here he became the duke's counsellor. He reformed the duke's small army, transacted business with his tenants, systematized the management of his mines and forests, and put his finances in order. Ten years were given to this. He then returned to literary labors with a mind enriched by con-

tact with the practical world. *Egmont* appeared in 1778; *Hermann and Dorothea* in 1797. *Dichtung und Wahrheit* (Poetry and Truth) is an autobiography of the poet's life up to his settlement at Weimar. His greatest work is *Faust*. The first part was published at Leipsic in 1790; the second part appeared in 1831, a few months before his death. His complete works occupy forty volumes. In 1806 he married.

Goethe lived fifty-six years at Weimar. Schiller, who had been appointed a professor in the neighboring University of Jena, at his request also settled in Weimar in an official capacity. Their friendship is one of the most noted in literature. A bronze statue, one of the most effective bits of art in Germany, stands in the Weimar marketplace. It represents Goethe offering the laurel wreath of poesy to the younger poet, Schiller.

The Weimar house in which Goethe lived for many years contains his manuscripts and many literary treasures. The interior is not shown to visitors, though a collection of mementos and personal effects may be seen on stated occasions. His court uniform and dressing gown are kept in the grand ducal library. Those in charge of the Goethe house have not seen fit to make public the materials for a complete life of the poet. At his death his remains were buried in the grand ducal mausoleum, where he rests side by side with Schiller.

Goethe's name is the greatest in German literature. He was eminent both in poetry and in prose. In his grasp of public affairs and the perception of large truths, he was far ahead of his generation. He was a farseeing man. He foretold the growth of America, the settlement of California, the construction of the Panama canal. In literature, his admirers claim that as a man of genius he ranks with Shakespeare and Dante. Certainly he was the greatest German of his age. It will require a century or two to settle his relative rank in the great republic of letters; but we may rest assured that it will be near the top.

See WEIMAR; SCHILLER.

SAYINGS OF GOETHE.

The eternal feminine.

With knowledge doubt increases.

Architecture is frozen music.

We are never deceived; we deceive ourselves.

On every mountain height is rest.

Nothing is more terrible than active ignorance.

I can promise to be upright but not to be without bias.

Let us not forget that man can never get away from himself.

Thus at Time's humming loom I ply.

Life is short, and art is long; therefore it is almost impossible to reach perfection in any thing.

The greatest difficulties lie where we are not looking for them.

To his valet no man is a hero.

After all, what can we call our own except energy, strength and will?

Who would the poet understand
Must go into the poet's land.

SAID OF GOETHE.

Goethe's life, whether as a writer and thinker, or as a living man, has indeed been a life of effort, of earnest, toilsome endeavor after all excellence.—Carlyle.

In the world's literature of the last two hundred years, it is right, I think, to say there is no name so great as Goethe.—Hosmer.

Gog and Magog, in the book of Ezekiel, a king and his nation, probably representing the northern peoples who were to invade western Asia. In British legend, Gog and Magog were two giants. As told by Caxton, the story runs that the Emperor Diocletian had thirty-three daughters. These women all murdered their husbands, and, as punishment, were cast adrift in a ship. They finally reached Britain and here became the mothers of a race of giants, the fathers of whom were demons. Brut, the first king of the Britons, slew most of these giants, but Gog and Magog were brought in chains to Brut's palace on the site of Guildhall, London. The effigies of these giants were long preserved in Guildhall. It is known that, as early as 1415, they were brought forth and used in preparing the city to welcome Henry V. They were destroyed in the great fire of 1666. The statues in Guildhall at the present time were erected in 1708. See BRUT.

Gogol, Nikolai Vassilievitch (1809-1852), a Russian dramatist and novelist. He received his education at the public

gymnasium at Pultowa and was later a teacher of history at the Patriotic Institution and in the University of St. Petersburg. His principal work is *Dead Souls,* a novel treating of the relations between Russian proprietors and serfs and the government.

Goiter, an enlargement of the thyroid gland, producing a large lump on one side of the throat. The cause is not understood, but it is supposed to be in some way associated with the quality of drinking water. It is prevalent about the eastern end of Lake Ontario; in some parts of Michigan; in the cantons of Freiburg and Berne, Switzerland; in the southern Alps, and in Savoy; in England, where it is called Derbyshire neck; in far Siberia, and in the heights of the Himalayas. In some sections of Europe eighty per cent of the inhabitants are afflicted with goiter. Physicians recommend bathing the goiter with tincture of iodine, and a change of residence. Exposure to the rays of the sun seems to have a beneficial effect. It is more common in women than in men, and is most likely to appear in middle age.

Golconda, the name of an ancient kingdom of India and its abandoned metropolis. It lay midway between Bombay and Madras. Golconda was an important center of the diamond cutting industry, and was consequently famous for these gems. It is a mistake to speak of the mines of Golconda, however, as the precious stones were brought to that city usually from some distance. The ruins of the old city are still remarkable for a vast number of mausoleums of its former sovereigns,—dome-crowned structures of gray stone, each with its own mosque and terraces. See DIAMOND; GEM.

Gold, a soft, lustrous, yellow metal. It may be beaten into sheets so thin that a fourth of a million are required to make an inch in thickness. Gold is 13.3 times as heavy as water. It melts at 1200° F., a greater degree of heat than is required to melt copper. Gold is widely distributed. There is two cents worth in every ton of sea water. It is found in silver and copper ores, in quartz veins, and in placer mines. The latter are not really mines, but gravel beds containing gold dust washed down by mountain torrents from crumbling gold-bearing ledges. Gold-bearing quartz and ores are first crushed to powder in stamp mills. The result is washed with a current of water to carry away the lighter particles, the remainder is passed over mercury which has a strong liking for gold and seizes upon it, forming an amalgam. Gold-bearing gravel is washed in the same way, or it may be rocked to and fro in a pan. Sometimes the gold grains are large enough to be taken from the bottom of the pan in the form of gold dust, but are usually secured by treatment with mercury. Hydraulic miners wash away banks and hillsides by directing streams of water upon the gravel through large hose pipes. The muddy water is caused to run away down the valley through a wooden sluice or trough to the bottom of which slats or cleats are nailed crosswise. Each cleat holds back a little pool of mercury into which the heavy grains of gold roll and are held in an amalgam.

The amalgam of gold and mercury is heated in a retort. The mercury passes over and is caught for use again. The gold is left free and may be cast in the form of an ingot or bar. Of late, due to want of water in many localities, a new method based on the fanning mill has been tried. Gold dust is heavy, and remains when other forms of dust and gravel are carried on by a blast of air.

Small quantities of gold are found in the Appalachian mountains. The Carolinas and Georgia have sixty or seventy gold mines and have produced as high as $1,000,000 worth of gold in a year. The Mother Lode of California is a vein of white, gold-bearing quartz that stands above the surface like a wall, and runs parallel to the main axis of the Sierras for eighty miles. California gold was discovered in 1848 by men engaged in digging a mill race. Thousands of men lost fortunes and thousands made fortunes in placer mining. One of the greatest gold veins ever opened in the United States was the Comstock Lode of Nevada, which, though primarily a silver vein, yielded many millions of dollars worth of gold. In the table that follows are given the figures for

gold production in fine ounces in some of the American states and in the Philippine Islands in 1921:

State or Territory	Fine ounces
Alaska	412,915
Alabama	10
Arizona	240,032
California	716,477
Colorado	363,218
Georgia	34
Idaho	22,668
Massachusetts	10
Missouri	14
Montana	91,802
Nevada	175,451
New Mexico	21,720
North Carolina	54
Oregon	49,714
South Carolina	14
South Dakota	209,842
Tennessee	285
Texas	5
Utah	102,975
Washington	7,160
Wyoming	10
Philippines	61,756
	2,476,166

The wonderful fields of the Yukon Valley assure the United States the lead in gold production for some time to come. Second in importance are the gold fields of Australia. The gold of the Altai, the Ural and the Caucasus mountains gave Russia first place for centuries until eclipsed by California and Australia. South African gold has come into prominence of late. The mountain districts of South America are gold producers; Mexico is a small producer; and Nova Scotia has a number of small gold mines. It is considered probable that western Canada contains large veins of gold-bearing quartz. The famous Klondike fields are in Canada.

The world's output of gold has risen steadily and by bounds from $27,000,000 in 1849 to $125,000,000 in 1891. In 1920 the production reached $334,987,610—almost a million a day. The world's production of gold in 1915 was the largest in history, or $468,724,913, against $466,136,100 in 1912 and $461,939,700 in 1911. The following shows production for some of the countries of the world in 1920:

County	Value
Africa	$188,790,860
United States	51,186,900
Australia	23,102,668
Russia	1,447,028
Mexico	15,265,568
Canada	15,853,478
British India	9,027,778
Colombia	5,800,000
Japan	5,518,015
Total	$316,292,295

In 1850 the world's stock of gold was reckoned at $1,606,400,000. At the end of 1920 it had grown to $8,245,826,000.

The chief use of gold is as money. Its bright color attracted the attention of the earliest civilizations, and it still ranks next to precious stones as an article of ornament. Gold was used for ornament and for money in Homeric times, and Caesar found gold pieces current in Great Britain when he landed in 55 B. C. Utensils of gold are still regarded as the limit of luxury. Gold is an excellent material for filling teeth, as it does not rust or cause the enamel of the tooth to decay. Genuine gilt is of gold, but, of course, many counterfeits are used. For all these purposes pure gold is too soft when used alone. It is therefore hardened by an admixture of some other metal. An addition of copper produces a darker or reddish yellow; silver imparts a greenish or pale yellow tinge; lead makes gold brittle. An alloy of gold, palladium, silver and copper is so hard that it is used for bearings in fine watches. American gold coins contain nine parts of gold to one part of other metals, as silver. Jewelers reckon the fineness of gold in carats. An 18 K ring is 18/24 pure gold. Gold is worth $20.63 an ounce. It may be exchanged for coin at any of the United States assay offices or mints. See MINT; WAGES; GILDING; GOLD LEAF; CARAT.

Gold Coast, a British colonial possession in Africa, lies along the Gulf of Guinea between the French Ivory Coast and Togoland; its coast line is 334 miles long, and with Ashanti and the Northern Territories, has an area of 80,000 square miles. By the census of 1921 the population was 2,029,750; Accra, the chief town, had 20,000, and Cape Coast Castle 11,000, inhabitants. The colony is administered by a governor with an executive and a legislative council.

Gold Coast Colony produces palm oil, kola nuts, cocoa, palm kernels, india rubber, manganese, gold, fish and timber. These articles are the principal items of the export trade; while cotton goods, machinery, fuel and illuminating oil, hardware, provisions, bags and sacks and building materials are the chief imports. The colony has about 275 miles of railroads and upwards of 2,500 miles of wagon roads.

The Gold Coast Colony has a deep, rich soil that will produce a variety of tropical crops, and efforts are being made to cultivate coffee, pepper, nutmeg, cotton, croton, pimento and cocoanuts, with very good chances of success. The natives are tractable and industrious and the economic future of the colony is assured.

Gold Leaf, gold beaten into sheets. It is much used for gilding books, gold leaf printing, and the like. The making of gold leaf is an art in itself. The gold is first rolled out into a ribbon, then cut into small squares, which are piled up alternately with pieces of goldbeater's skin. The pile is placed on a solid stone anvil, and beaten with heavy hammers, first one of sixteen pounds weight, and then eight, and so on, until the small squares of gold extend to the edges of the skins. The gold is then removed, repiled, hammered again, and cut into small squares. The process is repeated until the gold has reached the desired degree of thinness. A workman spends about three days, including changes, in working a ribbon of fifty pennyweights of gold into leaf. Standard leaves of gold are three and three-eighths inches square. They are put up in little books of twenty-five leaves each, twenty books in a pack. The incredible number of 254,248 sheets of ordinary leaves make an inch in thickness. Even this number may be increased by one-half. Attempts to do the work by machinery have failed to secure satisfactory results.

Goldbeater's skin is a tough, firm, delicate membrane prepared from the large intestine of the ox. The skins or leaves used in beating gold are so smooth that the precious metal does not adhere to them, and are so tough that they can be pounded for months with heavy hammers without injury. The skin is applied also as a sort of courtplaster for fresh cuts and wounds. Gold foil is a thicker sheet used by dentists in filling teeth.

The tiny thread of gold used in making lace or gold braid is made in another way. A silver rod is rolled in gold leaf until it is thoroughly coated. The rod is then drawn out into wire so delicate that an ounce of it reaches a mile in length. If a flat thread be desired, the wire is flattened between steel rollers. The silver remains covered with gold throughout the entire process, though what was a heavy coating at first becomes a mere film. To strengthen the gold wire, whether round or flat, it is twisted by machinery around threads of strong yellow silk made for the purpose. This is the thread used in making gold lace, gold braid, officers' epaulets, etc. The gold leaf industry centers largely in Germany. The following information is gleaned from a recent consular report:

This industry is carried on principally at Nuremberg, Furth, and Schwabach by several large concerns and many small ones. The total output is estimated at 6,000 packets of 500 leaves each per week, the value of the annual product being probably about $1,500,000.

The cost of production per packet of 500 leaves, 3⅜ inches square, is said to be approximately $1.07. The wholesale price per packet of size stated was, in 1908, $4.35 to $4.40 f. o. b. New York, exclusive of duty. The total importations of gold leaf into the United States in the fiscal year 1908 amounted to 14,796 packs of 500 leaves, the value being $68,417. The importations the previous year were 35,849 packs worth $167,263. The rate of duty is $1.75 per pack. The retail price in small quantities is 15 or 20 per cent more than the wholesale price.

One of the leading concerns in this trade estimates the following wages per week as the usual rates in this industry under normal conditions: Experienced men, $8.33 to $11.90; helpers, $4.76 to $7.14; gold cutters (female), $2.38 to $3.81. Much of the labor is done by piece-work, for which a scale of prices is agreed upon by employers and the gold beaters' union. Under the present scale the wages are as stated.

About two-thirds of the output of gold leaf from this locality is said to go to England, the remaining one-third being consumed in Germany, United States, Canada, India, and other countries. The value of the declared export of this product from this district to the United States in 1908 was $39,648.

Golden Age, a term used both in mythology and history to designate a period

of special prosperity and happiness. The mythological idea of a Golden Age which is common with most nations was of a time when earth yielded her fruits spontaneously, when man lived at peace with man and beast, when poverty and pain were unknown. The Greeks believed this happy state of things to have existed when Cronus, the Roman Saturn, reigned. After he was dethroned by Zeus conditions began to deteriorate. China, Egypt, Assyria, Media, Persia, each has its Golden Age. The reign of Elizabeth is called the Golden Age of England; the reign of Charles V, the Golden Age of Germany; the reign of Frederick the Great, the Golden Age of Prussia. See HESIOD.

Golden Fleece, the subject of a celebrated Grecian myth. A mother, whose boy and girl were in danger, appealed to Mercury for assistance. He gave her a ram with a golden fleece, on which she placed her two children to be conveyed to a place of safety. The ram sprang into the air and took his course toward the east. The girl, whose name was Helle, fell from her seat into the sea, in that part now called the Hellespont. The boy kept his hold and he reached the land of Colchis on the eastern shore of the Black Sea. Here he sacrificed the ram and gave its fleece to the king of that country, who had received him hospitably. The fleece was hung up in a sacred grove and guarded night and day by a dragon that never slept. Later, Jason, with his ship, Argo, and his crew, known as the Argonauts, set out to obtain the Golden Fleece. The cruise of the Argo has been supposed by some to be another version of Noah's deluge; by others the Golden Fleece is held to typify the wealth-bringing caravan commerce of the East, the land of Colchis being the point at which this traffic reached the Black Sea. See ARGONAUTS.

Golden Gate, a channel 4 miles long, and from 1 to 2 miles in width, connecting San Francisco Bay with the Pacific Ocean. Its waters wash the north shore of the peninsula on which San Francisco is built. It is defended by Fort Point, at the northwest extremity of the peninsula, and by a fort on Alcatraz Island.

Goldenrod, an autumnal flower of the composite family. There are over a hundred kinds, half or more found in eastern North America. They divide fairly the honors of autumn with the asters, and are the undisputed rival of the sunflower in late summer. The flowers are almost always yellow and are crowded in small heads. The flowers or florets in the outer circle of each head have strap-shaped corollas and both pistils and stamens. The inner florets have pistils only. After frosts the dry seeds fly in the wind like dandelion seeds. The root makes ready in the fall for early growth. While goldenrods may seem an endless maze, it is not difficult to separate the species in any one vicinity into four groups, whose flowers are disposed in masses that are (1) flat-topped; (2) pyramidal; (3) wand-like or bending to one side, or (4) clustered along the stem in the axils of the leaves.

Goldfinch, a genus of the sparrow family. The American goldfinch breeds from Hudson Bay to South Carolina and winters near the Gulf. The male is of a bright yellow with black wings and crown. He is a plump-bodied, fluffy little fellow, rather vain of his appearance. The female is tinged with olive. Three to six bluish white eggs are placed in a nest lined with thistledown in a bush or tree. The goldfinch flies in a wavy line. It is not unlike a canary in general appearance. It lives on seeds, being especially fond of thistle seeds. The American goldfinch is sometimes called "yellowbird."

Goldfish, a small carp with golden or silver scales. The goldfish comes originally from China, where the practice prevails among wealthy people of keeping them in basins in their homes or in courts. Goldfishes are hardy. They withstand changes of temperature and do not require frequent changes of water, especially if an aquatic plant or two be placed in the fountain. They are thought to show affection for each other, something not generally observed among fishes. The bright golden colors of the most prized varieties have been developed, it is said, from dull colored ancestors, just as improved live stock has been bred from the original wild animals.

Goldsmith, Oliver (1728-1774), a delightful English writer. He was born in Ireland. His father was an impoverished Protestant clergyman of English descent and young Oliver was flogged at school for a dunce. He was a rebellious ne'er-do-weel student for five years at Trinity College, Dublin. He waited on table for his board. He sang, played his flute, and danced when he ought to have studied. He was rejected for the ministry and set out for London to study law, but gamed away his money. He studied medicine at Leyden, and set out on foot for a tour of Europe,

> Remote, unfriended, melancholy, slow,
> Or by the Lazy Scheld or wandering Po.

His observations of travel are found in *The Traveler,* a poem full of good thought and noble sentiment. When he came back he lived in a garret in London and wrote for the magazines. Goldsmith became a member of Dr. Johnson's famous Literary Club, and was befriended by Edmund Burke, an old classmate at Dublin.

Dr. Johnson tells of a message from Goldsmith, one day, saying he had been confined to his room by his landlady, legally imprisoned until such time as he should pay his room rent. Dr. Johnson visited him, calmed his excited brain, found that he had a novel by him, took away the manuscript, examined it, sold it to a publisher for $300, and brought the money to Goldsmith. The latter paid his debts and berated his landlady in no measured terms. The novel was *The Vicar of Wakefield,* one of the world's immortal books. It is improbable that books will ever multiply to such an extent that a well chosen library, however small, can be without this simple tale.

Goldsmith wrote excellent comedies, the best of which are *The Good Natured Man* and *She Stoops to Conquer.* He was a famous writer for young people. Goldsmith's *Natural History* was long the most entertaining book of animals in print. A history of England, of Greece, and of Rome were favorite volumes with generations of young people.

The real nature of the man is poured out in a touching poem called *The Deserted Village.* It is one of the simplest, most sincere and sympathetic, hence one of the greatest and most endearing poems in the English language. If a reader has the idea that he does not enjoy poetry, let him try *The Deserted Village* before giving himself up. Goldsmith was in debt and difficulty up to the last day of his life. It is said he could keep neither money nor clothes, being able always to find some one poorer than himself to whom he felt like giving. Though not buried in Westminster Abbey, a monument has been erected there to his memory.

SAYINGS.

Measures, not men.
Silence gives consent.
The luxury of doing good.
The very pink of perfection.
Handsome is that handsome does.
To what happy accident is it that we owe so unexpected a visit?

> Man wants but little here below,
> Nor wants that little long.

SAID OF GOLDSMITH.

Let not his faults be remembered, he was a very great man.—Dr. Johnson.

Let his faults be remembered, since their tendency is to endear.—Washington Irving.

Think of him reckless, thriftless, vain if you like—but merciful, gentle, generous, full of love and pity. He passes out of our life and goes to render his account beyond it. Think of the poor pensioners weeping at his grave; think of the noble spirits that admired and deplored him; think of the righteous pen that wrote his epitaph—and the wonderful and unanimous response of affection with which the world has paid back the love he gave it. His humor delighting us still; his song fresh and beautiful as when he first charmed with it; his words in all our mouths; his very weaknesses beloved and familiar—his benevolent spirit seems still to smile upon us; to do gentle kindnesses; to succor with sweet charity; to caress, to soothe and forgive; to plead with the fortunate for the unhappy and the poor.—Thackeray.

Golf, gŏlf, a game formerly peculiar to Scotland, but now played all over the world and especially popular in America. It derives its name from the club, or set of clubs with which golf is played (Ger., Kolbe; Dutch, Kolf, club). It is uncertain when it was introduced into Scotland, probably from Holland, but it appears to have been played by all classes to a considerable extent in the reign of King James

I, son of Mary, Queen of Scots, who succeeded to the English throne in 1603. His son, Charles I, was much attached to the game, and on his visit to Scotland in 1641, was playing golf on Leith Links when he was notified of the rebellion in Ireland, "whereupon he threw down his club and returned in great agitation to Holyrood House." The Duke of York, afterward James II, also delighted in the game; and it continues to be a royal sport in Britain, though played alike by men of high and low degree.

Until comparatively recent years, golf was entirely confined to Scotland, where it still maintains its celebrity as a national recreation; but after the middle of the nineteenth century it was established in England, as well as in many of the British colonies, and found its way to the United States late in the seventies. Few then foresaw that the "Scotch" game was destined to sweep the country, enmesh all classes of the population in its pleasurable toils, change the habits and mode of life of the American business man, and compel his wife to take up the game in order to avoid becoming a "golf widow."

Golf is played in Scotland on what are called "links," corresponding to the English "downs," and the term links came into usage in America, though "golf course" is more commonly used. The links and downs of Great Britain are tracts of sandy soil covered with short grass, such as occur frequently along the east coast of Scotland. St. Andrews and Leven in Fife, Prestwick in Ayrshire, Musselburgh in Midlothian, North Berwick and Gullane in East Lothian, Carnoustie and Montrose in Forfarshire, and Aberdeen, are famous examples of Scottish links admirably suited to the game of golf, the ground being diversified by knolls, sandpits and other "hazards," as they are termed in golfing phraseology. The avoidance of these hazards is one of the most important points of the game.

Rules. The rules of golf, as laid down by the Royal and Ancient Golf Club of St. Andrews are those that govern nearly all younger associations in Great Britain, and its dominions overseas, and form the basis of the game wherever it is played. But in America the central authority is the United States Golf Association, organized in 1894, and there are subsidiary associations that cover every section of the country, each including in its membership numerous local clubs in cities, towns and villages, and many unaffiliated clubs. There are also several associations of women golf players. Municipal golf, played on public courses in city parks, etc., is an outgrowth of the game in recent years, Chicago leading in this respect with the laying-out of excellent golf courses in her parks and nearby forest preserves. In 1914, twenty years after the organization of the United States Golf Association, it was estimated that American golfers numbered over 750,000, and the number of active players was more than doubled by 1923.

The basic principles of golf, as long played in Scotland, may be thus described. A series of small round holes, about four inches in diameter and several inches in depth, are cut in the turf at distances of from one to four or five hundred yards from each other, according to the nature of the ground, so as to form a circuit or "round." The game may be played for practice by a single player, with the stimulus of seeking to lower his previous score for the round; but usually the players are rivals, either two in number, which is the simplest arrangement, or four (two against two), in which case the two partners either strike the ball on their side alternately, which is called Scotch golf in America, or each use a separate ball. The balls, weighing about two ounces and formerly made of gutta-percha, now rubber-cored, are painted white so as to be readily seen and followed after each stroke. They are 1⅝ to 1¾ inches in diameter.

The object of the game is, starting from a given point, usually called the first "tee," to drive the ball into the first hole with as few strokes as possible; and so on round the course. The player, or pair of players in Scotch golf, whose ball is holed in the fewest strokes has gained that hole; and the match is usually decided by the greatest number of holes gained in one or more rounds, eighteen holes constituting

a round. But frequently the match is made to depend on the aggregate number of strokes taken to play one or more rounds. American courses are laid out with either nine or eighteen holes, according to the extent of the ground available. On nine-hole courses it is necessary to play over the ground twice to constitute an official "round."

Golf Clubs. An ordinary wooden golf-club consists of two parts spliced together, namely, the shaft and the head. The shaft is usually made of hickory or lancewood, the handle covered with leather; the head, heavily weighted with lead behind and faced with horn, is made of well-seasoned hardwood, appletree or thorn wood being used by the Scottish club-makers. Clubs with wooden shafts and iron or steel heads, commonly called "irons," are also used. Steel-shafted clubs have also been introduced in recent years.

Each player has a set of clubs, differing in length and shape of head to suit the distance to be driven, the nature of the ground, and the "lie" or position of the ball when each stroke is to be made. For it is a rule that the ball must be struck as it happens to lie, except in driving off the first shot toward a new hole, when the ball may be "teed"—that is, it may be placed advantageously on a little heap of sand, called a tee. In making the tee shot, a wooden club called a driver is commonly used, and the second shot is usually also made with a wooden club, called a brassie, because it is brass-shod. Subsequent shots, when required to reach the hole, are made with iron clubs, which include the driving-iron, midiron, mashie, niblick and putter. The seven clubs named constitute a conventional set of clubs, but many golfers use as many as ten or more. The additional clubs, which are non-essential to an average player, include the cleek, spoon, jigger, mashie-niblick, putting cleek, and other variations of the conventional implements of golf.

The Game. Playing a hole in golf may be said to be divided into three parts or stages, namely, driving, or distance shots, approaching and putting. The distance shots are made with the wooden clubs or a driving-iron, and when the ball has been driven to within 150 or 100 yards of the objective hole, the approach shot is made, its object being accuracy instead of distance. For this purpose the midiron, mashie or mashie-niblick is used. The grass is usually cut short around each hole and the ground smoothed to make what is called the putting-green, usually from 40 to 60 feet in diameter, and on many courses these greens are elaborately cared for and kept almost as smooth and true as a billiard-table. When the ball finally reaches the green, the play enters on its third stage, called "putting." This consists of tapping the ball toward the hole with an iron club called the putter, and with this club the player finally "holes out." The same course of play follows at each succeeding hole.

Golf is a scientific game, as all who essay to play it soon find out. To play it well requires long practice, and few attain to great excellence who have not played from their youth. But anyone may learn to play tolerably well in a season or two, and will take great pleasure in the game from the very start, for it possesses an extraordinary fascination for all who once begin to play. It has this advantage over many other outdoor games, that it is suited for both young and old. Fathers, mothers, sons and daughters may play together, with enjoyment and benefit to each, for while playing together, each plays an individual game. It requires complete concentration of the mind upon each pending stroke, and is therefore restful to the tired business man; it cultivates patience, courtesy and the bodily senses. The strong and energetic find scope for their energy in driving long balls, to distances of 200 yards or more; but the more important points of the game—an exact eye, a steady and measured stroke for the short distances and skill in avoiding hazards, or "bunkers"—are called forth in all cases. Along with the muscular exercise required by the actual play, there is the exercise of walking, which particularly suits those whose daily pursuits are sedentary, and is undertaken in pleasant open spaces which make it far

more beneficial than an ordinary "constitutional."

GOLF IN CANADA. Golf was introduced into the United States about 1880, but Canada took up the game in the early seventies and the Royal Montreal Golf Club was organized in 1873. The St. Andrew's Golf Club of New York was the first formed in the United States, and was organized on November 18, 1888. This example was soon followed in other cities and towns throughout the country; private golf clubs soon abounded. By the beginning of the twentieth century public links began to make their appearance and golf ceased to be regarded as exclusively a "rich man's game." Today the merry cry of "Fore!" pervades the land, as men and women, boys and girls, enjoy this health-giving pastime and the President of the United States and the captains of industry keep themselves fit for their responsibilities with a daily game of golf. See HOCKEY; ST. ANDREWS.

Golgi, Camillo (1844-), an Italian neurologist, was born in Corteno and educated at the University of Pavia. He became a physician and practiced at Abbiategrasso. He became a great medical authority and wrote several works on pathology and histology. His outstanding work in pathology was the discovery of three varieties of malaria parasite. A class of nerve endings found in tendons are called the "organs of Golgi."

Golgotha. See CALVARY, MOUNT.

Goliath of Gath, a champion of the Philistines, when at war with the Israelites, as recounted in I Samuel, xvii. For forty days at morning and evening this giant, whose height was "six cubits and a span," presented himself before the Israelites and dared any one among them to come forth and fight with him, but none would accept the challenge. At last Goliath is slain by the boy David, who refuses all armor and all weapons except his sling and "five smooth stones out of the brook." He goes forth trusting in the Lord who "delivered him out of the paw of the lion and out of the paw of the bear," and the stone from his sling "smote the Philistine in his forehead and the stone sunk into his forehead," and he fell to the earth. Then David ran and stood upon the giant, took his sword and cut off his head which he carried to King Saul. The Philistines, seeing their champion dead, lost heart and took to flight. The Israelites pursued them, returning victorious. See DAVID.

Gomez, gó′mās, **José Miguel** (1856-1921), a Cuban revolutionist and statesman, who was active in the various Cuban rebellions against Spanish rule. Under the new republic Palma was the first president. In 1905 he was reëlected but Gomez, the defeated Liberal candidate, under pretext of alleged frauds at the polls, headed a revolt against Palma's government. Palma resigned, and finally the United States stepped in to restore order. This was accomplished in 1908, and at a popular election Gomez was chosen the next president. The day of his inauguration immediately after the ceremonies, the American military governor withdrew from the island. Since then President Gomez has conducted the affairs of that turbulent little republic, the people of which are one-third negroes and two-thirds illiterate, with great firmness and ability. He is a man of the people,—daring, resolute, yet cultured and courteous of manner, with a personal magnetism which has made him generally beloved.

Gomorrah. See SODOM.

Gompers, Samuel (1850-), a leader of American labor. He was born in London and while yet a child of ten was apprenticed to a shoemaker. Such education as he received was gained after working hours. At thirteen he came to America and engaged in cigarmaking. He rose to the presidency of the cigarmakers' union. He was influential in forming the Cigar Workers' International Union and, later, the American Federation of Labor. He was elected president of the latter organization in 1882. He stood from the first for freedom from alliance with any political party. He was named by common consent editor of the Federation organ and did a large part of the thinking for the organization. For years Mr. Gompers gave his services to the cause of labor. During the great strikes of 1886 he trav-

eled extensively at his own expense. When the Federation was in shape financially, he was accorded a salary. Mr. Gompers has declined desirable appointments and lucrative employment to devote his energies to trade unions. In 1909 he traveled extensively in Europe. He headed the delegation in 1918 which presented the claims of labor at the Peace Conference. See FEDERATION OF LABOR.

Gondola, gŏn′do-lȧ, a long, narrow boat with slender pointed ends upturned to the height of one's head. The ordinary gondola is scarce wider than a four-oared skiff, but is three times as long. A well appointed cabin is provided in the middle for passengers. The gondolier stands in the stern, facing forward.

Gonsalvo de Cordova—Gonzalo Hernandez y Aguilar (1453-1515), a Spanish general, was born at Montilla, near Cordova. Gonsalvo, called the "Great Captain," rendered valuable service to Queen Isabella in the war against Portugal and in the final overthrow of the Moors of Europe. When in 1500 Louis XII of France and Ferdinand of Aragon made war upon Naples, Gonsalvo commanded the Spanish invaders and took possession of the kingdom. But in 1502 the victors quarreled over the division of the spoils, and in the ensuing war of 1503, Gonsalvo again led the Spaniards, gained a number of important victories, and finally forced the French to relinquish Naples. Ferdinand now presented him with the duchy of Sessa, and appointed him Viceroy of Naples with unlimited power. But Ferdinand, jealous of his general's popularity, recalled him in 1507.

Goober. See PEANUT.

Good Friday, the Friday preceding Easter Sunday. It commemorates the crucifixion of Christ, and is observed as a day of religious service, especially in the Roman Catholic and Protestant Episcopal churches. In England and Ireland it is a legal holiday. In some of the American states, also, Good Friday is a school and bank holiday. Coming on a certain day of the week, the date necessarily shifts. The actual date of the Crucifixion is held to be April 6, 30 A. D.

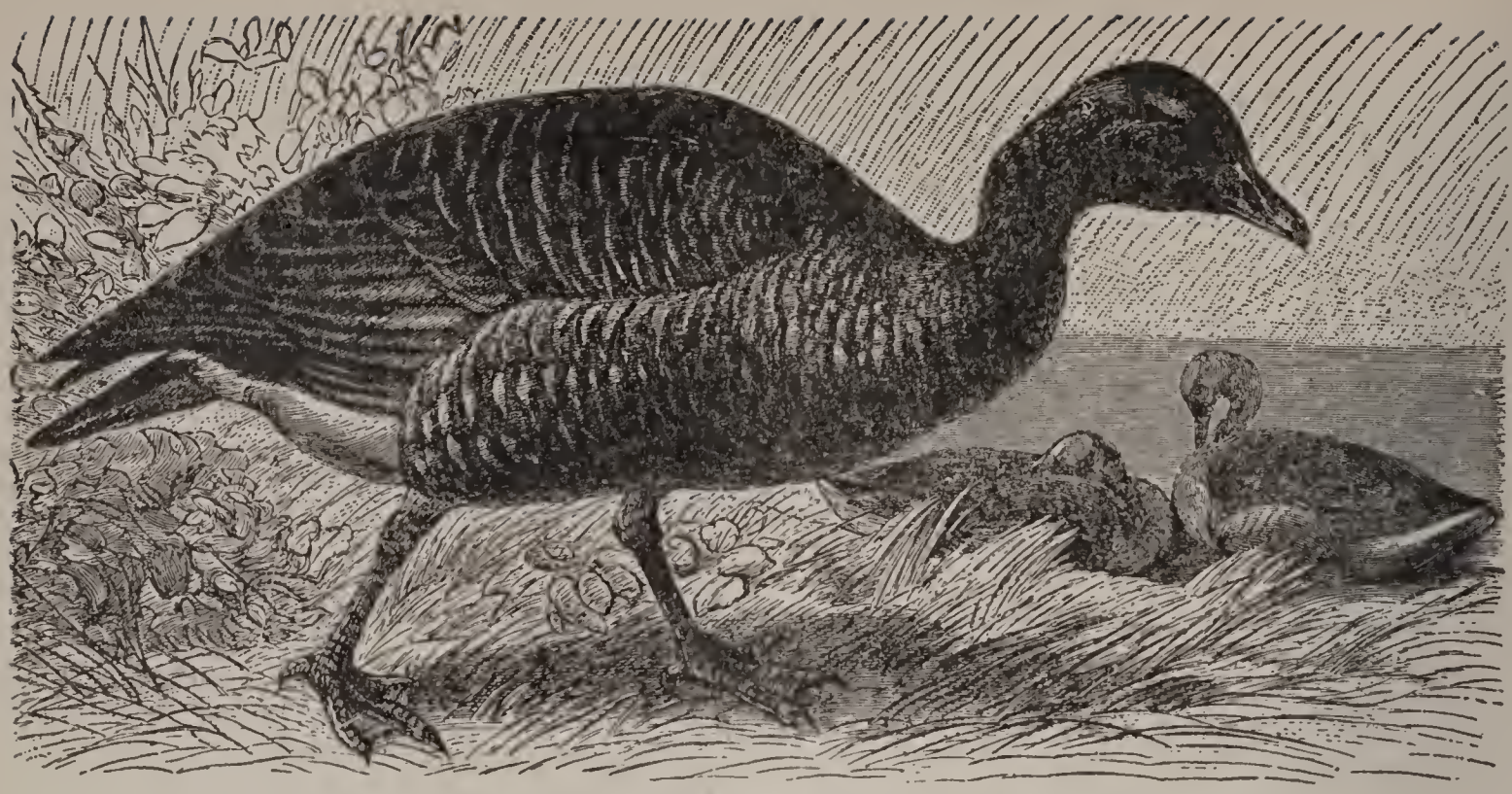
Goodrich, Samuel Griswold (1793-1860), an American writer, long known by the name of "Peter Parley." He was born at Ridgefield, Connecticut. He became a publisher in Boston, edited several periodicals, and wrote many juvenile books on a variety of subjects. The "Peter Parley" books, as they were called, included geographies, histories, stories, and articles on various arts and sciences. Two popular periodicals for young people which Goodrich conducted were *Peter Parley's Magazine* and *Merry's Museum.* During the presidency of Millard Fillmore Goodrich acted as American consul in Paris. He there published a French treatise on *American Geography and History.*

Good Templars, a secret order devoted to total abstinence from intoxicating liquor. The first lodge was organized in 1851 at Utica, New York, by Daniel Cady and his associates. Lodges were established in England in 1868. Members may be of either sex. They are pledged not to reveal the passwords and other secrets of their order. Also "that they will never make, buy, sell, use, furnish, nor cause to be furnished to others, as a beverage, any spirituous or malt liquors, wine, or cider, and will discountenance the manufacture and sale thereof in all proper ways." There are in all about 360,000 members. Lodges have been established throughout the English-speaking world.

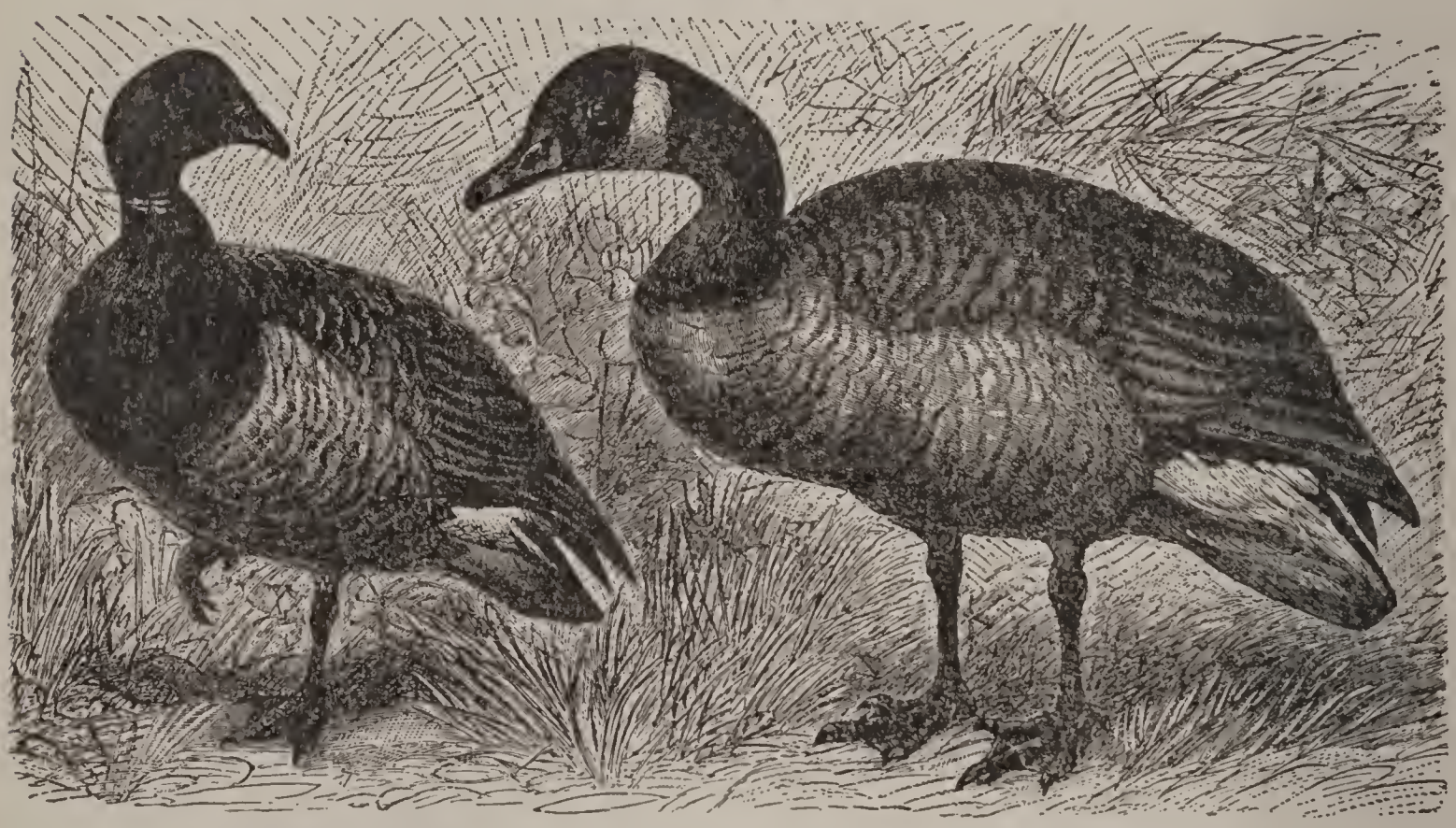
Goodwin, Nathaniel Carl (1857-1919), an American actor whose success in comedy roles made him very popular. He was born in Boston, Mass., and after a short business experience, made his debut at the Howard Athenaeum in a play entitled *Law in New York.* Mr. Goodwin was a remarkable imitator. After attaining to the variety stage he attracted general attention, especially for his work in the burlesque of *Black Eyed Susan.* Besides playing in vaudeville, Mr. Goodwin took leading parts in *A Gold Mine, A Gilded Fool, An American Citizen, The Genius, Beauty and The Barge* and *Nathan Hale,* his greatest success.

Goodyear, Charles. See RUBBER.

Goody Two Shoes, a tale usually but improperly classed with fairy stories. It

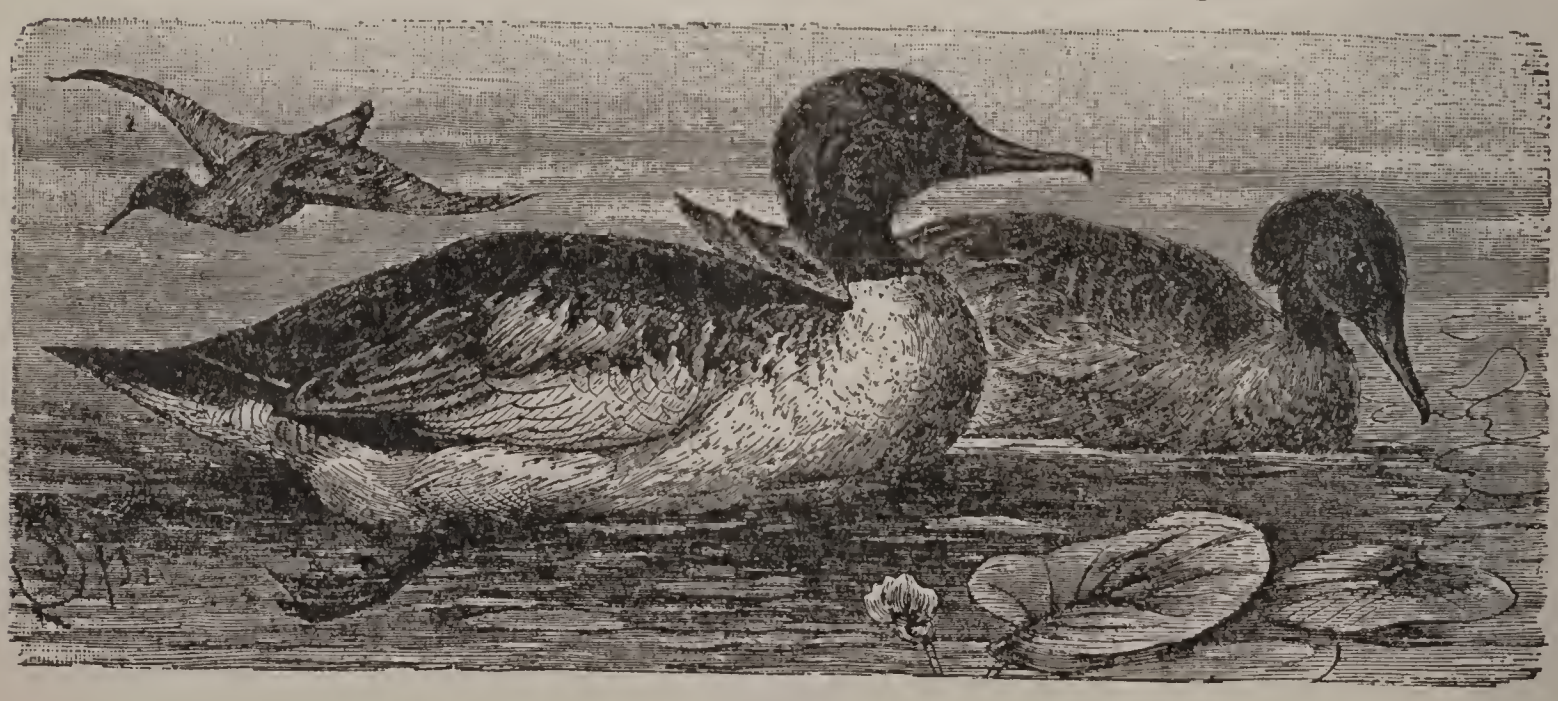


Domestic goose.



Bernacle goose.

Canada goose.



GEESE.

is a story of a little girl so poor as to have but one shoe. When given a pair, she is so delighted that her constant repetition of the words "two shoes, two shoes," wins for her the nickname of Goody Two Shoes. No supernatural element is introduced, although the little girl is so extraordinarily good, unselfish, and capable as to seem almost supernatural. She is rewarded for her virtue and kindness by the affection of friends and neighbors, by a happy marriage, and by being reunited with her only relative, a brother from whom she was separated while a young child. The story was published first by Newbury, an English publisher, in 1765. The author is not known with certainty, but the story is supposed to have been written by Oliver Goldsmith.

Goose, a family of aquatic birds allied to the duck and the swan. The goose is naturally less confined to the water than the duck and is vegetarian in diet. The goose is larger than the duck. Its legs are placed farther forward. In Europe, especially in Germany, the domestic goose holds the place of the turkey in America. It is the descendant of the European wild goose. Its quills or stout wing feathers were long used for pens. There are some even yet who will write with no other. Live goose feathers, that is, feathers plucked from the living birds, make the softest feather beds and pillows.

The wholesale goose market of Berlin is one of the sights of the city. In addition to the geese raised in every village an immense number is imported, chiefly from Russia, to the value of $2,000,000 annually. They are brought alive from the Russian frontier in five-decked goose cars, holding 1,200 geese each. During the autumn a special goose train brings in from fifteen to forty cars a day. The German villages, the traditional home of the goose-herd, now raise 4,000,000 geese a year. The empire imports 7,000,000 geese a year, chiefly from the region of the Black Sea.

The common American or Canada goose is a noble game bird, ranking with the wild turkey. Its "honk, honk," as a long v-shaped line led by an old gander fan the air on the way northward, is one of the first signs of spring; and, when still longer lines of wild geese go south, the northern farmer feels that winter is upon him. The breeding grounds of the wild goose are retreating farther and farther north in British America before the advance of settlements. Hunters in the northwestern wheat-growing region, particularly in the Red River Valley, still count on sport during the autumn migration. They shoot the geese on the wing, frequently from pits or booths made in the passes usually traversed by the low-flying geese on the way to or from some lake where they are wont to rest at night to the stubble field where they glean by day under the guard of sentinels. Wild geese are less afraid of a team than of a person afoot. They seem to recognize a gun at a distance. The Canada goose takes kindly to captivity, raising its young in entire content.

"On one occasion," says William T. Hornaday, "a flock of nine geese, flying southward over the New York Zoölogical Park, suddenly espied our flock on the pond. Without a moment's hesitation, the wild birds sailed down and alighted on the shore beside their relatives, and invited themselves to the banquet of cracked corn. On the following day, seven of the visitors were coaxed into a huge wire cage on the shore, where they were caught and wing-clipped to prevent further wandering away to danger. The seven are still there, but the two unclipped birds, after remaining all winter, flew away north the following spring, and it is quite likely that their bad judgment has, ere now, cost them their lives."

See DUCK.

Gooseberry, a fruit-bearing shrub closely related to the currant, from which it differs in having a spiny stem and frequently spiny berries. The name is an English corruption of *gorse* berry. Our cultivated varieties are chiefly from England, though they are supposed to be native to North Asia. An effort is now being made to tame our native gooseberries. Were it not for its spines, the gooseberry would be more popular. Several of our wild

gooseberries are smooth, but it must be acknowledged that our prickly fruit has a superior flavor.

Gopher, gō′fer, a burrowing ground squirrel, native in the prairie regions of North America. The latter name is much to be preferred. There are several species, bearing a general resemblance to the chipmunk, but exceeding it in size. The striped ground squirrel has about thirteen lines of color running the length of its back, dirty white stripes alternating with rows of dark spots on a yellowish ground. A western species is much like it only larger. A gray species is found from Illinois northwestward. This squirrel excavates long burrows, extending beneath the reach of frost, and stores considerable quantites of prairie seeds. It is troublesome to farmers in a newly settled country. It sleeps away the winter in a snug nest well lined with grasses. The little animal has a fashion of sitting upon its haunches to see what is going on. When on a trip from burrow to field it scampers along for a few yards, then sits up to look about and resumes its journey. When a bit of prairie is freshly burned, well worn gopher paths may be discovered running here and there. On bright spring days the gopher delights to sit up near its burrow and whistle defiance to the world of care. The name gopher is French, and may be given to any burrowing animal; hence its application to the Louisiana gopher, which is a tortoise that takes shelter by burrowing in the sand. See PRAIRIE DOG; CHIPMUNK; SQUIRREL.

Gopher, Pocket, a family of pouched rodents. There are several species inhabiting the plains of Central and North America. The pouched gopher has teeth like those of a rat and soft fur. It looks like a large mole, but it has a wrinkled, villainously cross countenance. Its peculiar name comes from a large outside pouch, which may be likened to a deep, roomy dimple, near each corner of the mouth. The pocket gopher lives underground. Instead of pushing the dirt aside and crowding its body through, as a mole does, the gopher excavates long passages like the tunnel of an underground railway, something more than the depth of a plow furrow beneath the surface. The fore paws are armed with strong claws with which it digs its way, cramming the dirt into its pouches until they are bulged like apples. It then proceeds to the mouth of its burrow and ejects the soil, by a muscular heave of the pockets, to a distance of four or five inches. When the tunnel has progressed a few yards, the old opening is filled up and a new outlet is made above the point of digging. The course of the tunnel may be traced by the piles of dirt —a few quarts, or possibly a half a bushel, at regular intervals, sometimes for half a mile across the prairie sward or stubble field. The gopher is quite shy and ceases to work if alarmed, but resumes when all is quiet. About all that one can see, however, is a handful of dirt mysteriously heaved out every once in a while.

The gopher lives on such roots apparently as it meets in its burrowing or finds readily in its burrow walls. It collects stores of the roots of wild sunflowers and the like. Ordinarily the pocket gopher does little damage. Once in a while it locates a row of young potatoes and follows it industriously, taking every tuber. Gophers are easily taken by setting a steel trap loosely sprinkled with earth in the bottom of the tunnel. The excavation must be covered up again to darken the runway. Badgers are the chief foe of the pocket gopher. When pursued it burrows rapidly, packing the dirt behind it. A dog cannot dig fast enough to overtake it. The western prairies are dotted with little hillocks a few feet high, called gopher knolls. It is not known whether they have been heaped up by generations of pocket gophers or not; but, at all events, they are centers of gopher life deep within which the home nest is excavated.

See CAMASS.

Gordian Knot. According to legendary lore, Gordius, king of Phrygia, tied the neck yoke of his chariot to the pole with a knot so intricate that no one could untie it. An oracle, or tradition of the temple in which it was kept, ran to the effect that whosoever untied the knot should become master of Asia. Young Alexander, afterward called the Great, heard of this knot, and went with his companions to see it. After a careful examination, he drew his

sword, it is said, and severed the yoke from the pole. Hence the proverbial expression of solving a difficulty "by cutting the Gordian knot." See ALEXANDER THE GREAT.

Gordon, Charles George (1833-1885), a British soldier. He served in the Crimean War with credit. During a rebellion in China he was employed, with the consent of his government, to command a force of native troops. His service was highly creditable to his military skill, and gained him the name of "Chinese Gordon." In 1873 he was appointed to succeed Sir Samuel Baker in the command of the troops of the khedive of Egypt.

He had influence over the Arabs in the vast territory known as Sudan. In 1881 an Arab enthusiast preached a crusade against the presence of foreign, that is to say, English people among true believers. He announced himself as a Messiah or Mahdi, and raised the religious fervor of his followers to the point of a holy war against infidels. Gordon proceeded to Khartum on the upper Nile with a view to withdrawing outlying garrisons. Here he was besieged for a year, when he and his entire force were slain by the Mahdi.

Gordon, Charles William (1860-), a Canadian novelist, better known by his pen name of Ralph Connor. He was born at Glengarry, Ontario. He received his education at Toronto University and at Knox College. He became a Presbyterian minister and in 1890 went into the Rocky Mountains as a missionary among the miners and lumbermen. Four years later he became pastor of a church in Winnipeg, and there began writing his popular stories, *The Sky Pilot, Black Rock, The Man from Glengarry, Glengarry School Days.*

Gordon, Daniel Miner (1845-), a Canadian educator and divine, was born at Pictou, Nova Scotia, and educated at Pictou Academy and at the universities of Glasgow and Berlin. Ordained a minister of the Church of Scotland in 1866, Dr. Gordon was pastor of churches at Ottawa, Winnipeg and Halifax. As chaplain of the 90th regiment, he saw active service during the Northwest Rebellion and was awarded a medal for bravery. From 1894 to 1902 he was professor of Systematic Theology and Apologetics at Halifax Presbyterian College. In the latter year he was appointed principal and vice-chancellor of Queen's University, Kingston, retiring in 1917. While serving in this capacity, Dr. Gordon made every effort toward bringing the university to the front rank of Canadian educational institutions, and was largely successful. He is the author of *Mountain and Prairie,* a book of travel.

Gordon, George W. (1836-1911), a Confederate general, the last one to serve in the United States House of Representatives. Born in Tennessee he spent his youth in Mississippi and Texas, and was graduated in 1859 from the Western Military Institute of Nashville. He followed the profession of civil engineering, but at the outbreak of the Civil War enrolled in the Confederate army as drillmaster, retained the position a few weeks, was promoted to captain, passed through the various ranks, and finally rose to that of brigadier-general. He was prominent in all the campaigns of Tennessee and Georgia. General Gordon served with honor at Chickamauga, Missionary Ridge, and in the series of engagements between Sherman and Johnston while the former made his famous march to the sea. In his last battle, that of Franklin, Tennessee, November 30, 1864, General Gordon led the first line of assault against the Union forces. His command was practically annihilated; this is said to have been the bloodiest engagement of the war. After its close the general practiced law in Memphis, was superintendent of schools in that city, and held an official position in the Interior Department of the federal government. At the time of his death he had entered on his third term in Congress, and was commander-in-chief of the United Confederate Veterans.

Gordon, John Brown (1832-1904), an American soldier and statesman. He was born in Upson County, Georgia. After his graduation from the university of that state he studied law, and was admitted to the bar. At the outbreak of the Civil War he joined the Confederate Army as captain, rising rapidly to the rank of lieutenant-

general. When General Lee surrendered at Appomattox, General Gordon commanded one wing of his army. Eight times he was wounded—five times at Antietam. From 1873 to 1880 he was United States Senator. He was governor of Georgia from 1887 to 1890. From 1891 to 1897 he served again in the Senate, where he was a Democratic leader. For a long time he was commander-in-chief of the Confederate Veterans of America. He was a popular lecturer on the Civil War.

Gorgas, William C. (1854-1920). General Gorgas was a graduate of the University of the South and of Bellevue Hospital Medical College. He became an army surgeon in 1880 and had risen to the rank of major at the outbreak of the Spanish-American War. He was sent to Havana as chief sanitary officer of that city during the American occupation, and through his efforts, combined with those of Dr. Finlay, of Havana, the fact that yellow-fever was carried by mosquitoes was fully established. Not only Havana but the island of Cuba was freed of that scourge. Major Gorgas was appointed Surgeon-General and sent to Panama, where, in 1907, he was made chief sanitary officer and a member of the Panama Canal Commission. Under his able management, the Canal Zone was transformed from one of the most pestilential regions in which white men live to a land where the death rate became less than that in many of the large cities of the world.

Gorgon, or **Gorgo,** in Greek mythology, a frightful monster with brazen claws, huge teeth, and hair entwined with snakes. Homer refers to a gorgon as one of the phantoms of Hades. Hesiod, however, mentions three gorgons. Two of them were immortal, but Medusa, the only one who figures prominently in ancient legends, was subject to death. Any mortal who looked upon a gorgon was turned immediately to stone. Medusa was slain by Perseus, and her head given to Minerva, who placed it in the center of her shield. The word gorgon is used frequently to designate anything which is unusually hideous. Hawthorne has retold the story of Medusa in *The Gorgon's Head.*

Gorilla, the largest of the man-like apes. The male is larger than a man, being about six feet tall and sometimes weighing 500 pounds. Gorillas usually walk on all fours, but they can walk in an upright position better than other apes. The body is short and heavy and the arms are so long that the finger tips fall below the knees. The skin is black and covered with coarse gray hair. The teeth are large and the jaws so strong that the gorilla can easily crack nuts which would require a blow from a heavy hammer. Gorillas live in the equatorial forest of western Africa, and it is estimated that there are not more than 2,000 in the world. They feed on nuts and spend most of their time in the branches of trees, where they make nests resembling hammocks for the females and young. The male has but one mate. See CHIMPANZEE; OURANG-UTAN; MONKEY.

Gorky, Maxim (1868-), the pen name of a Russian social writer whose real name is hardly pronounceable by an English reader. He was born at Nijni-Novgorod. He was by turns a shoemaker's apprentice, a scullery boy, baker, ship's cook, porter, gardener, painter of ikons or sacred images, lawyer's clerk, and literary tramp. His writings set forth the thoughts and want of thoughts of the vagrant and working classes with which his life has made him familiar. His novels began to attract attention in 1892. *Foma Gordyeeff* is best known. Titles more easily remembered are *The Orloff Couple, About the Devil, More About the Devil, The Reader, The Outcasts Three Men, Mother, The Spy.* Gorky visited the United States in 1906, lecturing on social themes and advocating the extreme measures of the Russian radicals.

Gorse, a thorny shrub of the pea family, also called furze and whin. Gorse grows abundantly on the hills of northern England and Scotland. It is a bushy plant, two to four feet high, with narrow, dark, evergreen-like leaves, and a wealth of two-lipped yellow flowers. Scott, Stevenson, and other writers of Scottish adventure make much of hiding in the whin. This is the plant from which the gooseberry or gorseberry is named. See BROOM; GOOSEBERRY.

Goshawk, a fine, large hawk of the falcon family. The name is derived from an old English word meaning a goose **hawk,** or a hawk used to take geese. Falconers train the goshawk to take rabbits and hares as well. Unlike the falcon that strikes from above, the goshawk follows its prey in a straight line and strikes from behind. The female is about twenty-four inches in extreme length. The male is smaller. Both sexes are slaty blue on the upper parts. The under parts are cross-barred with dark color on a whitish ground. The American goshawk nests in Canada, but winters as far south as Virginia. It is bluer in color than the common henhawk. A naturalist says of this species: "It is the most daring of all the hawks, and while in pursuit of its prey is apparently less concerned by the presence of man than any other. It will dart down unexpectedly at the feet of the farmer and carry off the fowl." A pair of these hawks will exterminate a flock of prairie chickens or ptarmigans. See HAWK.

Gossamer, a fine, filmy cobweb, such as may be seen in stubble fields or on low bushes. It is spun by a small spider. In the calm, clear weather of autumn, gossamer films may be seen floating in the air. It is said that, by clinging to its gossamer, the minute spider is carried miles and miles. The term is applied to a variety of fine gauze, much used for veiling, also to any light fabric. It is also applied, inappropriately, however, to thin water-proofing material from which women's rain cloaks are made. SEE SPIDER.

Gosse, gŏs, **Edmund William** (1849-), an English poet, lecturer, and literary critic. Mr. Gosse has made a special study of Scandinavian literature, the results of such study having been given to the world in *Studies in the Literature of Northern Europe.* Among his other works may be mentioned *Life of Gray, From Shakespeare to Pope, History of Eighteenth Century Literature, History of Modern English Literature.* His poetical writings include *Madrigals, Songs and Sonnets, On Viol and Flute, In Russet and Silver.*

Gotham, gō′tham, a parish in Nottinghamshire, England, noted for the simplicity of its inhabitants. "Foolish enough for Gotham," is a proverbial expression in England. According to tradition, the inhabitants assumed a stupid, loutish look during a visit from King John, thus leading him to think that it would be undesirable to build a palace in their neighborhood. It is a disputed question whether this were not the part of the shrewdest kind of worldly wisdom.

Gotham is now a nickname for New York City. In 1807 the inhabitants were called Gothamites by Washington Irving in his *Salmagundi.*

The rhyme appended is from Hallowell's *Collection of Old English Nursery Rhymes:*

> Three wise men of Gotham
> Went to sea in a bowl,
> If the bowl had been stronger,
> My song would have been longer.

Gothenburg, gōt′en-bûrg, the second city of Sweden. It was founded by Gustavus Adolphus in 1619. It lies in the direct route by water from Copenhagen to Christiania. It rose to commercial importance during the Napoleonic wars. The present population is about 162,480. It has important manufactures of sugar, machinery, leather, cotton, and beer. It has an excellent dock. Ships are built here. It is noted for the so-called Gothenburg system. In 1865 the city decided to make an experiment in decreasing drunkenness by taking the sale of intoxicating liquors out of the hands of those who derived a profit from it. The city grants a monopoly of the sale of liquors to a company. All salesmen are placed on salary. No liquor may be consumed on the premises. The profit of the traffic, over and above six per cent, goes to the city treasury. It is claimed that, under this system, drunkards and minors are unable to obtain liquor, so that drunkenness has decreased. During thirty years of trial the number of distilleries has run down from 2,300 to 132. Instead of one saloon to 8,000 inhabitants the number has changed to one saloon to each 13,000. Certainly the public treasury has been filled. The system has spread to a large part of the Scandinavian peninsula. It must be regarded as still on trial, how-

ever. Few believe that the company keeps good faith with the government. South Carolina is trying a somewhat similar plan. See DISPENSARY SYSTEM.

Goths, a Germanic tribe. The Goths became established on the Lower Danube in the third century. An earlier home has been assigned them, not with certainty, however, on the shores of the Baltic. The king of Sweden is styled "King of the Swedes and the Goths." The Goths are described by writers of the time as tall, athletic men, with fair complexions, blue eyes, and light hair, not unlike many Scandinavians of the present day. The Goths invaded the Roman Empire at various times. They became converted to Arian Christianity. Historically, about 369 they divided into Visigoths, or western Goths, and the Ostrogoths, or east Goths. The Ostrogoths settled on the Black Sea; the Visigoths, on the Danube. A portion of the Bible was translated into the Gothic language by the great Visigothic apostle, Ulfilas. Six different manuscripts have been found. One of these is now possessed by the University of Upsala, Sweden. It is a beautiful parchment, written in letters of gold and silver. From a literary point of view, as well, it is considered one of the most precious treasures in the possession of any library. It is the oldest known literary fragment in a Germanic language. It is studied by scholars who desire to know what the Germanic language was like at that early day. The Visigoths migrated westward and formed a kingdom in southern France and Spain. Later, the Ostrogoths for a time established a kingdom in Italy. The pointed style of buildings used very generally in the noted cathedrals of Europe is called Gothic architecture. See THEODORIC; ALARIC; RUNES; ARIANISM.

Gotland, the land of the Goths, the largest island in the Baltic Sea. It lies sixty miles from the Swedish mainland. It is a limestone plateau about seventy miles long by fifteen wide. The surface is well watered. The soil is rich. Many huge boulders left by ancient glaciers lie about. The climate is mild. Orchards flourish. The farmers are thrifty and pride themselves on dairy products, ponies, sheep and wool. They have drained the peat swamps that once abounded and call them in jest the "gold mines of Gotland." Gotland, with its capital, Wisby, was once a commercial center, and the city also once dominated the Asiatic trade. Population, about 52,000.

Göttingen, an old Hanseatic town in the Prussian province of Hanover. It is situated in the valley of the Leine, fifty-nine miles southeast of Hanover. Its commercial prosperity was destroyed practically by the Thirty Years' War. It is at present a city of about 30,000 inhabitants. It is noted chiefly for the celebrated university of the same name. The university was founded in 1734 by George Augustus of Hanover, George II of England. It was attended by many English and American students. Many noted men have been connected with this institution. Among those best known to Americans are the brothers, Jacob and Wilhelm Grimm, who were expelled from the faculty for political reasons. Göttingen was the first German university to attract American students. Ticknor, Everett, and Bancroft studied here. The names of Emerson and Longfellow appear in the roll of the American colony. Motley, the American historian, and Bismarck, the German statesman, formed a friendship for life at Göttingen. The library contains 400,000 volumes and 5,000 manuscripts. A botanical garden and a museum are connected with the university. There are about 1,000 students in attendance.

Gottschalk, Louis Moreau (1829-1869), an American pianist and composer, was born in New Orleans, La. At the age of 12 he began the study of music in Paris under Hallé and Stamaty, and from 1845 to 1852 made successful concert tours in France, Spain, Switzerland and South America. Returning to the United States, he visited every large city, repeating his foreign successes, playing or conducting his own compositions. Though Mr. Gottschalk's compositions covered many branches of music, it was as a composer for the piano that he excelled. His works include about 90 pieces for the piano. *The Last Hope* is considered his masterpiece.

Gough, gŏf, **John Bartholomew,** an American temperance lecturer. He was born at Sandgate, Kent, in England, in 1817 and died at Frankford, Pennsylvania, in 1886. He came to New York in 1829, but neglected his trade of bookbinding and took to drink. As a comic singer and teller of capital anecdotes he was in demand in the lowest groggeries of the city. In 1842 he took the pledge which, with a slight relapse, he kept for the rest of his life. He occupied the lecture platform for forty years. He was a most talented and eloquent speaker on the topic of temperance, ranking in platform ability with Spurgeon and Beecher.

Gouin, Sir Lomer (1862-), a distinguished Canadian statesman, appointed Minister of Justice in 1921, was born at Grondines, Quebec, and educated at Laval University. Admitted to the bar in 1884, Sir Lomer was elected to the Quebec legislature in 1897, and became minister of public works in 1900. From 1905 to 1920 he served as premier and attorney-general of Quebec. This period of 15 years was marked by perhaps the most substantial industrial and financial advance in the history of the province. Sir Lomer retired to private practice in 1920, but was again called into Dominion public life in 1921.

Goujon, Jean (1520 ? - 1572 ?), the greatest sculptor of the French Renaissance. Working chiefly in collaboration with the famous architect Pierre Lascot, the fame of Goujon rests largely upon his subtle manner of harmonizing his work with the architecture of his collaborator. The origin of Goujon is unknown, and it is not known when he died. Like many other artists of his day Goujon was a Hugenot (Protestant), and he may have been killed in one of the many attacks upon his co-religionists. He worked with Lascot on the restoration of the church of Saint-Germain-L'Auxerrois in Paris, and two bas-reliefs executed by him are now in the Louvre. At a corner of the old Cemetary of the Innocents in the Rue aux Fers, Paris, Goujon erected a wonderful series of fountains. In 1786 these fountains were removed and arranged in a public square, where they still are known as the *Fountain of the Innocents.* Goujon worked with Lascot on the construction and decoration of the Louvre, and the Gallery of Musicians at the Louvre is a beautiful monument to his genius.

Gould, Jay (1836-1892), an American capitalist, was born at Roxbury, N. Y., and educated at Hobart College. He began his career as a surveyor, but soon became interested in railroad stocks, and by their manipulation amassed a fortune. He was the founder of the Gould system of railroads, which later, under the management of his son, George J., was greatly extended. In 1869 Gould's firm cornered the supply of gold in New York and caused a financial panic on September 24, which is still referred to as Black Friday.

Gounod, gōō-nō′, **Charles François** (1818-1893), a great French composer. His father was a well-known painter and engraver of Paris, where Gounod was born. When the boy was five years old his father died, leaving but little money to his widow and children. Gounod insists that all his later success was due to the influence and training of his mother. She was herself a trained musician, and a woman of fine character. When eighteen Gounod entered the Paris Conservatory, where he studied under the best masters. After a year's study he won the second *prix de Rome* and two years later the *grand prix de Rome.* While in Rome he studied chiefly religious music which appealed to him strongly; he has written a number of masses, and two great oratorios, *Life and Death,* and *Redemption.* Of his operas the greatest are *Faust* and *Romeo and Juliet.* See ÉCOLE DES BEAUX ARTS; MUSIC.

Gourd, gōrd, the fruit of a vine allied to the squash, pumpkin, and melon. Gourds have hard, thin shells, which fit them well for ornaments and household utensils. Some of the tribes of interior Africa were found by Dr. Livingstone to have almost no other utensils; dippers, bottles, baskets, and buckets being made from the calabash gourd. The fruit of the calabash tree of the West Indies is used by the natives for similar purposes, whence its name. Some idea of the va-

riety of shapes may be had from names selected from a catalog, as bonnet, dipper, spoon, p. wder horn, ostrich egg, etc. See PUMPKIN; SQUASH.

Gout, a disease of the joints, particularly of the knees and feet. Medical authorities are uncertain as to the cause and nature of gout. It is accompanied by the accumulation of a salty acid in the afflicted joints, and causes most excruciating pain. To step on a man's gouty toe is an unpardonable offense. The disease is supposed, at least by those who do not have it, to be the result of high living, especially the drinking of wine.

Government, a term used to describe the different agencies by which any given community or state defines its will.

The earliest form of government was the patriarchal. As man developed his social instincts, and began to live in communities, the family became the political unit, and the head of a family was the absolute ruler over all the members of that unit. As population increased, and social relations became more complex, a more complete political organization became necessary, and gradually three distinct types of government developed: the oligarchic, the monarchic, and democratic. An oligarchy is a government in which the ruling power is vested in the hands of a few men. Such was Athens under the eupatrids. In a monarchy, the executive power is vested in a single person, usually hereditary, whose power is either absolute or limited by a constitution. Until recently Russia and Turkey furnished excellent examples of absolute monarchies where the sovereign's will was law; England, on the other hand, is the best example of a limited monarchy, where the real power is not in the sovereign's hands. In a democratic government, the supreme power rests in the hands of the people, and is exercised by them directly, in which case we call it a democracy; or through representatives, when it becomes a republic. No state at the present time is a pure democracy; under the reforms of Cleisthenes, Athens was for a time a true democracy. The United States, France, and Switzerland are examples of republics.

Governor, a device for regulating the speed of machinery. Watt, the inventor of the steam-engine, is responsible for the governor, as well as for many other of its accessories. The regulation of the speed is either by a throttle-valve in the steam-pipe or by controlling the supply of steam to the cylinder. In general the regulation is secured by centrifugal force due to increased speed causing balls to rise against gravity or against the force of springs. A decreased speed reverses the effect. Thus may the motion of the engine remain uniform with light or heavy load. Sometimes the governor is mounted upon the spoke of the flywheel, from which by a suitable gearing the supply of steam is increased or decreased.

Governor-General, the title borne by the personal representative of the king of England in Canada, who is, by commission from the king, the executive head of the government of the Dominion. The Governor-General acts with, and is advised by, the members of the Dominion Privy Council in every executive function pertaining to the internal interests of the Canadian provinces. It is his right and his duty, on the other hand, to submit to the imperial government such proposed legislation as, in his opinion, is subversive of the imperial interest. He is, then, in this delicate position—he serves the Dominion in all affairs of local import, but recognizes no superior but his king when royal rights are jeopardized. The Governor-General has his own flag, significant of his high office. He is oppointed to his position by the king for a term of five years, as a rule, at a salary of $50,000 a year.

All expenses of the Governor-General, including salary and maintenance of Rideau Hall, his official residence at Ottawa, are borne by the Canadian Government.

The real power and influence of a Governor-General depend much upon the tact, strength and intellectual force of the holder of the office. By constitutional practice, however, the real power is in the hands of the Premier and his cabinet.

Gracchi, grak′-i, **The Two,** Roman brothers who championed the cause of the poor against the wealthy. Though of aris-

tocratic lineage, the Gracchi opposed the senatorial party in the interests of the poor. Two thousand owners, it is said, held the greater part of the arable land of Italy.

In the year 134 B. C., the older brother, Tiberius Gracchus, caused himself to be elected tribune. He was a remarkable orator, and aroused the people to such a pitch of indignation that the voters passed a law restricting the ownership of land to a moderate estate. The surplus was divided into small fields and distributed among the peasants who were without homes. The poor were permitted to occupy the lands on the payment of taxes to the government, but, in order to prevent their being bought out by the wealthy, they were not authorized to sell. The rich, who were thus deprived of their unjust holdings, raised the cry of confiscation and robbery.

Tiberius offered himself for reelection, but on election day he was slain. Ten years later his brother Caius was elected to the same office. He secured the passage of needed measures for the welfare of the people. Caius died in 121 B. C.

Grace Greenwood. See LIPPINCOTT, SARA.

Graces, The Three, in Greek mythology, the goddesses of grace and beauty. They presided over the dance, the banquet, and all social pleasures. Their names are Aglaia, brilliancy; Euphrosyne, mirth; and Thalia, the blooming. They are usually described as in the service of other divinities, and are patrons of music, eloquence, poetry, and all arts that delight and elevate.

These three on men all gracious gifts bestow
Which deck the body or adorn the mind,
To make them lovely or well-favored show;
As comely carriage, entertainment kind,
Sweet semblance, friendly offices that bind,
And all the compliments of courtesy;
They teach us how to each degree and kind
We should ourselves demean, to low, to high,
To friends, to foes; which skill men call Civility.
—Spenser.

Grackle, a crow-like bird. In England the term is applied to a small crow or jackdaw. In India it applies to two different birds called the religious birds,—the religious grackle and the paradise grackle. In America we have the purple grackle or crow blackbird, the Texas or boat-tailed grackle, and the rusty grackle. The term is of very uncertain application.

Grady, Henry Woodfin (1850-1889), an American journalist. He was a native of Athens, Georgia, and was graduated from the University of Georgia in 1868. After various journalistic experiences, including that of Georgia correspondent for the *New York Herald,* he purchased an interest in the Atlanta *Constitution* and acted as its editor until the time of his death. Mr. Grady early attracted attention by his powers of description and the felicity of his English. His description of the Charleston earthquake led to the preparation of magazine articles. He was in demand as an after dinner speaker and as a platform orator. His vigorous, hopeful, sympathetic utterances brought him forward as one of the foremost thinkers, writers, and speakers of the reconstructed South. He was a son of Georgia, with unbounded faith in the future of the commonwealth, but his interests were national in their scope. He cherished the memory of the lost cause, but lived in the present and worked tremendously for the future. He never sought or held office. Among his noted addresses are *Just Human,* delivered at Atlanta; *The New South,* given before the New England Society of New York; and *The Future of the Negro,* spoken before the Merchants' Association of Boston only a few days before his untimely death. We make room for a paragraph:

Let me picture to you the footsore Confederate soldier, as, buttoning up in his faded gray jacket the parole which was to bear testimony to his children of his fidelity and faith, he turned his face southward from Appomattox in April, 1865. Think of him as ragged, half starved, heavy-hearted, enfeebled by want and wounds, having fought to exhaustion, he surrenders his gun, wrings the hands of his comrades in silence, and lifting his tear-stained and pallid face for the last time to the graves that dot the old Virginia hills, pulls his gray cap over his brow and begins the slow and painful journey.

Grafting, the operation of setting a part of one plant into another. If this be done in such a way that the fresh

sap-carrying part of the one comes into contact with that of the other, sap will flow through the union, and the part set in will grow and produce leaves, flowers, and fruits, as if it had not been removed from the parent plant. The plant on which the grafting is done is called stock, the graft or scion is the part, usually a twig or bud, which is inserted. The purpose of grafting is two-fold; first, to make sure of desirable fruit. Seedling apple trees from the seed of the same apple are not certain to bear fruit like the original apple, but if fifty seedling apple trees be cut off near the ground and grafted with twigs from a bearing tree, we shall have fifty new trees with fruit like that of the tree from which the grafts were taken. All fruit trees sent out by responsible nurserymen have been grafted for this purpose. Then again, grafts are set on hardier stock. The Russians graft apples on Siberian crab roots. If, for instance, the soil is better adapted to peaches than to plums, plums may be grafted on peach roots. It is a mistake to suppose that any two woods will grow together. The stock and graft must be closely related, as two roses, a plum and a cherry, etc.

Three general kinds of grafting are practiced. In each case the fresh sap-carrying wood of the graft must come into contact with fresh sap-carrying wood of the stock. This is the gummy cambium layer between wood and bark.

1. *Grafting Proper.* The stock is cut off and split downward. The lower end of the scion is cut to a wedge shape and inserted with care, so that cambium layer meets cambium layer on one side at least of the wedge. Frequently two small scions are inserted, one at each side of the split. If both grow, one may be cut off. The joint is surrounded by wax or even a ball of wet clay to keep the wound moist. The method just described is called cleft grafting. It may be used also in renovating the branches, top grafting an old tree. Whip-grafting consists in splicing the scion and the stock, each being cut off on a long slant so that the end of the one slips past the end of the other in such a way as to form a continuous body of about the same size. Scions are usually three buds long.

2. *Budding.* A single bud is detached from the branch on which it grew and is inserted beneath the bark of the stock. To admit the bud a crosscut is made in the smooth bark of the stock, and the bark is split downward from the middle of the crosscut. The corners or flaps of the bark, which must peel readily, are raised; the bud is inserted, and the corners let back to cover the edges of the bud. The wound is sealed with wax (wax is made of tallow, 1 pound; beeswax, 2 pounds; resin 4 pounds), or the incision may be covered by a strand of basswood bark, yarn, or raffia. After the bud has grown in well, the stock is cut off a little above the graft. Budding is generally used in grafting plum and peach trees.

3. *Inarching.* Two branches of separate, living plants are crossed obliquely. The cambium layer of each is exposed. The two are bound closely together and waxed. After the two have grown together the root is cut away from the scion and the top is cut off from the stock. In this way the entire top of a branching plant may be transferred to another root. Ingrafting is, of course, laborious; but it is the safest plan. Exhibition fruit is sometimes produced by ingrafting below the fruit and cutting away one tip, thus increasing the flow of sap to that twig on which the fruit is growing.

See APPLE; ORCHARD, etc.

Graham, George Perry (1859-), a noted Canadian statesman, several times a member of the Canadian Parliament, was born at Egansville, Ontario. After engaging in teaching for a few years, Mr. Graham abandoned that profession for journalism. He became managing director of the *Recorder,* Brockville, Ont., managed the Morrisburg *Herald* for eleven years, and for a time was associate editor of the Ottawa *Free Press.* Entering the Ontario legislature in 1890, he was appointed provincial secretary in 1904. In 1907 he became leader of the opposition in the Ontario legislature. During 1907-08 Mr. Graham represented Brockville in Parliament, represented South Renfrew in 1912, and was Minister of Railways and Canals during 1907-11. His energy and political ability won him wide popularity.

Grail, The Holy, the cup from which Christ drank at the Last Supper. According to tradition, the cup came into the hands of Joseph of Arimathea, who caught in it some of the blood which flowed from the wounds of Christ when taken down from the cross. The wonderful virtues of the cup are due to these drops of blood which represent the body of the Lord. In a time of persecution Joseph was miraculously conveyed with the Holy Grail to England, where he passed the rest of his life. The cup furnished him with food and drink in time of need, and with spiritual support. At his death he gave the cup to his successor, charging him to guard it well. It passed from generation to generation. Finally, it disappeared from view because of the sins of its custodians. The search for the Holy Grail was the object of many a knightly adventure. Only the pure in heart might ever hope to find it. It is interwoven with the legends of King Arthur and the Knights of the Round Table. The origin of the tradition is a subject of dispute. When the Celts migrated to the French coast of Brittany they carried the traditions of the Holy Grail with them. Medieval writers had two sources of information, Wales and Brittany. French, German, and English writers have used the legend as literary material. In Lowell's *Vision of Sir Launfal,* "a maiden knight" goes forth in search of the Holy Grail. Wagner uses the same theme in his musical drama of *Parsifal.* The Holy Grail is the subject of one of Tennyson's *Idylls of the King.*

Grain Elevator. See ELEVATOR.

Gram. See METRIC SYSTEM.

Grammar, in a broad sense, the science of the use of language. Specifically, the grammar of any language is a systematic description of the words composing that language, and of the relations of those words to each other. Orthoepy, the pronunciation of words, and orthography, the spelling of words, belong properly to grammar, but in schools and text-books it has been found more convenient to treat them in other departments. English Grammar then, as a subject of study, consists usually of three parts: 1. The classification of words; 2. Inflection of words; 3. Syntax, or the relations of words to each other.

No one of these divisions of grammar can be studied with any degree of completeness by itself, for one must learn something of the relations of words to each other before he can classify them or understand their inflections. Words are classified according to their use in eight groups, called parts of speech. They are the noun, pronoun, adjective, verb, adverb, preposition, conjunction, interjection. Since they are classified according to use, it will be seen—and it is a point to be emphasized—that the same word does not remain always in the same class. Moreover, a group of words, as a phrase or clause, may be used as one word and is then assigned to its particular class as is any single word. Each part of speech must be studied by itself. There are different kinds of nouns, pronouns, adjectives, etc. They possess certain properties and undergo various changes.

Inflections are the changes which may be made in the forms of words to modify their meaning. Nouns and pronouns are said to be declined, verbs to be conjugated. Inflection includes both declension and conjugation. English is not highly inflected, that is, the changes of form are few, and are learned easily.

Syntax is the most important division of grammar. In fact it would not be much out of the way to treat the words as synonymous, and define grammar as the science which treats of the relation of words to each other. Since language is the expression of thought, the sentence—the expression of one complete thought in words—is the basis of language, the basis also of grammar and of syntax. The essential parts of a sentence are subject and predicate. All other parts are modifications of these two. If this fact concerning the sentence is once understood clearly, the seeming complications of syntax are greatly simplified. In the curriculums of our public schools grammar appears from the fifth to the seventh grade and is continued through the eighth grade.

Grampus. See PORPOISE.

Granada, gra-nä′dä, an ancient kingdom of the Moors. It had a Mediterran-

ean frontage and now forms three provinces of southern Spain. Granada, the capital city of the kingdom, was also the chief commercial city. It is beautifully situated on two rivers at the foot of the Sierra Nevada. First the city with its terraces and gilded mosques, then the Alhambra, and behind these the snow-capped mountains,—travelers describe Granada as an imposing sight. The Moors made their last stand in Europe here. Sixty thousand men held the city for a year against the forces of Ferdinand and Isabella, but they were forced to surrender their stronghold in 1492. See MOORS; FERDINAND V; ALHAMBRA.

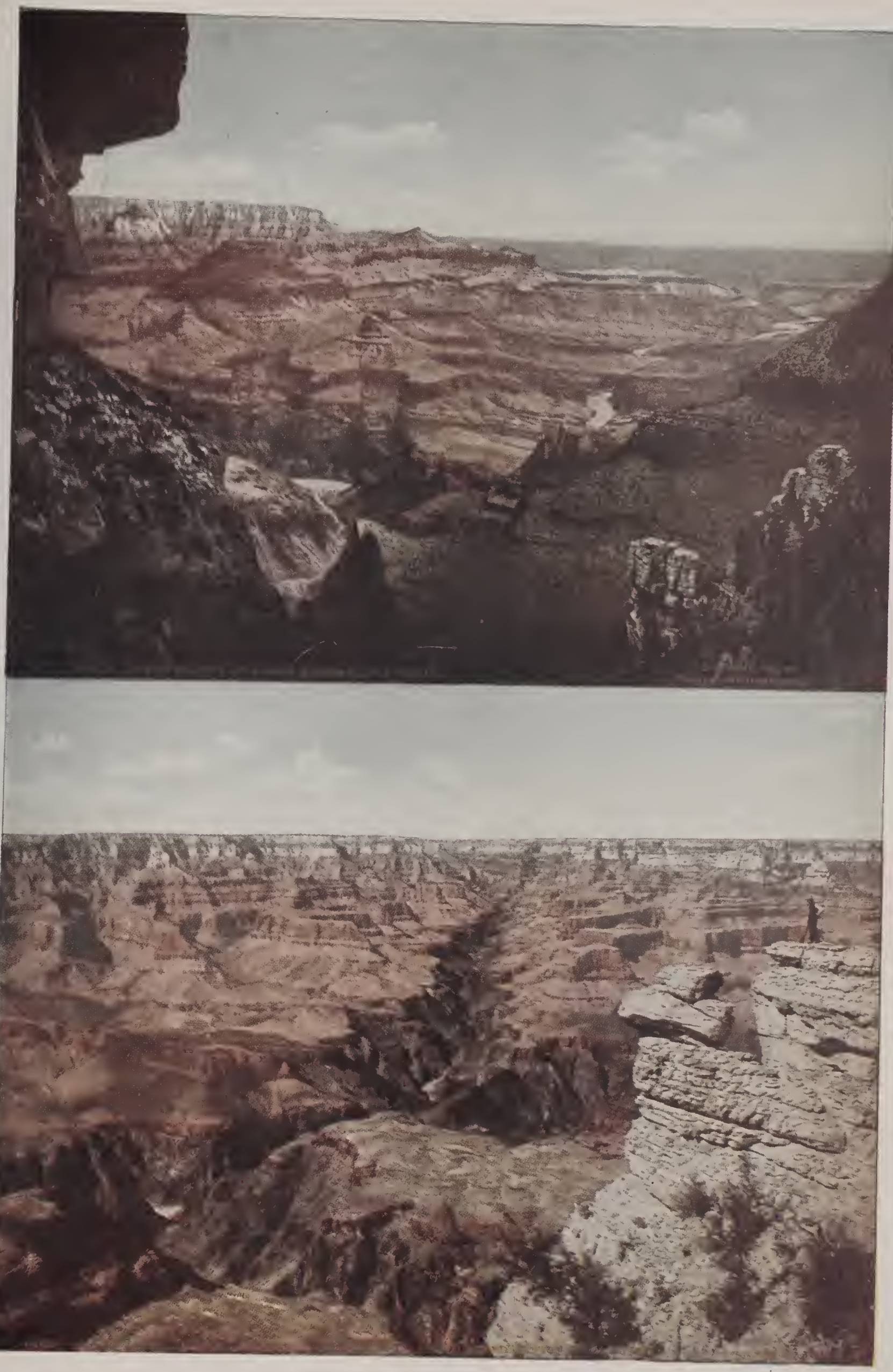
Granby, Quebec, Canada, an industrial town of Shefford County, is on the Tamaska River, thirty miles north of the international boundary and fifty-five miles southeast of Montreal. It is served by the Central Vermont Railroad, and also has interurban connection with a number of neighboring towns. The largest industrial plant in the city is engaged in the manufacture of rubber goods; other products are sashes, doors and blinds, elastic webbing, tobacco products, plumbers' supplies, maple sugar, brooms, sap spouts, lasts, lumber and celluloid goods. Besides the public schools, there is a library and a college. In 1921 the population was 6,785.

Grand Army of the Republic, a patriotic organization. Its membership is open to honorably discharged soldiers and sailors of the Civil War. Local organizations are called posts. Conventions are called encampments. The first post was organized at Decatur, Illinois, April 6, 1866. The first national encampment pitched its tents at Indianapolis, November 20, 1866. It is a non-partisan association designed to keep alive comradeship and to aid needy survivors and their families. Among the results of its efforts may be mentioned the general adoption of Memorial Day, the erection of numerous monuments, and the preservation and care of battlefields. Influence has been brought to bear also in favor of the establishment of soldiers' homes and the extension of pensions to classes of old soldiers not included under preceding laws. At its height the organization included 400,000 members. There were in 1922, 4,326 posts, and the membership in 1921 was 85,678. The death rate is now very high.

The G. A. R. badge is a bronze star and a ribbon flag hung from a strap. A relief on the star represents a soldier and sailor clasping hands before the figure of liberty. Two freedmen are in the foreground. The United States flag is draped at the sides. The uniform is a dark blue fatigue suit with a black slouch hat. An increasing tendency is noticeable to hold union meetings with the veterans of the Confederate army. Auxiliary organizations are the Woman's Relief Corps and the Sons of Veterans.

Grand Banks, the world renowned fishing grounds of Newfoundland and its principal wealth producer, are banks of sand, gravel and rock, a triangular submarine tableland, lying at a depth of from 50 to 1000 feet and extending for 200 miles along the Newfoundland coast and 500 miles southwestward into the Atlantic, toward the European coast. The banks swarm with fish, especially cod, and British, American and French fishermen to the number of 100,000 annually dare fogs, storms and icebergs in specially rigged boats called "bankers." The extreme fogginess of this region is caused by the meeting of the Labrador Current and the Gulf Stream.

Grand Cañon, a remarkable gorge cut by the Colorado River. It is over 200 miles long, 10 to 20 miles wide, and a mile deep. It is situated in the northwest part of Arizona in a rainless region. The rocks are limestones, sandstones, quartzites, shales, slates, and schists, including strata gorgeously colored by minerals. The Grand Cañon is not a crack or flaw in the strata, but an enormous canal or gorge cut by running water. The vast plain in which the Cañon lies was traversed by the Colorado River. Internal forces began to raise the plain; a fraction of an inch per century is as good a guess as any. The stream cut its way as fast as the plain rose, until now it runs on archaean rock a mile below the sur-



GRAND CANYON OF THE COLORADO.

1. From Hance's Trail. 2. Bright Angel Canyon

face. As a matter of fact the river is where it has been for geologic ages; the plain has risen on both sides of it.

The Grand Cañon was seen first in 1540 by a party of Coronado's men. Catholic missionaries confirmed the reports, but no addition was made to a scientific knowledge before 1858. In 1869 Major Powell explored the region and shot the river for a distance of 1,000 miles, including not only the Grand Cañon, but a cañon above and a cañon below. His reports are graphic and of astounding interest. On first approaching it, the valley is a confused but grand spectacle of gorgeously colored terraces, towers, pinnacles, and rocks. On attaining a favorable point of view the river may be seen like a slender ribbon far below. The stream runs between precipitous faces of rock, possibly 1,000 feet high; but above this immediate channel the valley is flaring. The view from the upper brink is panoramic. The observer at the water's edge looks up through a narrow, darkened slit and sees but a strip of the blue heavens infinitely high above his head. From the hotel on the upper level the pathway leading down to the river's edge is seven miles in length. The trip down and back is a severe day's trip for all but mountaineers. The gorgeous buttes across the chasm seem but a rifle shot away, the air is so clear; but, as a matter of fact, they are ten miles distant, and a visit would involve 150 miles of cañon trails. The rainfall is so slight that the cliffs and needles stand practically as they were sculptured by whirling grains of sand impelled by the seething Colorado, ages ago.

The most interesting part of the cañon is easily reached by train from Williams, Arizona, and it is visited by thousands of tourists every year. In 1919 this region was made a national park.

Grand Forks, the second largest city of North Dakota, beautifully located just below the junction of the Red River of the North and the Red Lake River. The state university, situated about a mile from the city with which it is connected by an electric line, is an institution of great promise. River boats ply back and forth between Grand Forks and Winnipeg. The city has grown rapidly of recent years, and has numerous good business blocks and hotels. There are good schools and fine residences, and a Carnegie public library. Besides being the seat of various manufactories, making flour, woolen, and foundry products, Grand Forks is a great distributing center for the farming country which surrounds it. In 1920 the population was 14,010.

Grand Island, Nebr., the county seat of Hall County and the third city of the state, is 154 miles west by south of Omaha, on the Union Pacific, Burlington and other railroads, and on the Platte River. This city is the commercial center of an extensive agricultural district, and has a large trade in grain and live stock. In the manufacturing plants of Grand Island are produced beet sugar, canned goods, candy, windmills, bricks, cement building blocks and wire fence. The Union Pacific Railroad maintains large machine shops here. The Nebraska Soldiers' and Sailors' Home is located here; also Grand Island College. The city has fine public schools and a Carnegie library. In 1920 the population was 13,947.

Grand Rapids, a city of Michigan noted particularly for furniture manufacturing. It is known throughout the state as "The Furniture City"; the value of this product amounts annually to over $9,000,000. It is located on the Grand River about thirty miles east of Lake Michigan, through which it carries on water traffic with Chicago, Milwaukee, and other principal lake ports. It is a great railroad center. The falls of the Grand River furnish some water-power but the demand for power has greatly exceeded its capacity. There are manufactories of many commodities, some of which are refrigerators, lumber, cigars, clothing, hosiery and knit goods, shoes, brushes, woodenware, farm implements, iron goods, and leather. Large gypsum quarries near the city provide material for the manufacture of gypsum plaster and its allied products. The printing industry is important. The State Masonic Home, the Michigan Soldiers' Home, and several philanthropic institutions are

located there, besides a number of fine public buildings, notably the artistic Federal Building, the Ryerson Public Library containing over 100,000 volumes, and the new Central High School Building embodying the best ideas in school construction. In 1920 the population was 137,634.

Grand Pré, the picturesque village immortalized by Longfellow in his *Evangeline,* somewhat at the expense of historical accuracy and perspective, is in King's County, Nova Scotia, fifteen miles northwest of Windsor, on the Dominion Atlantic Railroad. It is separated from the Minas Basin by Long Island and the Grand Pré Dike. The village was settled by the French colonists, but they were expelled by the British in 1713, at the close of Queen Anne's War.

It is the birthplace of Sir Robert Borden, who was Premier of Canada from 1911 until almost the close of the World War.

Grand Vizier. See TURKEY.

Grangers, the popular name of the Patrons of Husbandry, a secret organization of agriculturists founded in Washington, D. C., in 1867. Secrecy is confined rather more to the executive sessions than to any other business of the organization. The movement spread rapidly between 1872 and 1875, having in the latter year about 1,500,000 members. The Granger constitution forbids the organization's entrance into politics. One of the functions of the alliance, as conceived by its originator, was to assist in restoring kindly feeling between the North and the South; another was to protect and advance, by all legitimate means, the interests of American agriculturists. The Grangers were influential in the movement that resulted in the appointment of a secretary of agriculture as a cabinet officer and in the establishment of agricultural experiment stations. Their numbers and influence have dwindled very rapidly in the last decade.

Granite, a coarse-grained crystalline rock. Typical granite is composed of three minerals,—quartz, feldspar, and mica. Either hornblende or augite may occur with the mica or may replace the mica entirely. The prevailing color is imparted by the feldspar, which varies from red to pink. Some granite is very dark, while other is of a light gray color. The three minerals of which it is composed are mixed in varying proportions, one being sometimes almost wanting. Syenite is similar to granite except that it lacks quartz. In genuine granite the flakes of mica assume all positions. In case the flakes of mica are made to assume a parallel position, as by enormous pressure, giving the rock a slightly laminated structure, it becomes gneiss. Granite is an igneous rock formed by the cooling of molten masses. It is the chief rock of New England. New Hampshire is called the old Granite State. Geologists assert that granite hills may be recognized at a distance by their rounded form, resembling enormous bubbles.

Granite weathers, that is to say, disintegrates, very slowly. Granite hills are not, therefore, likely to be heavily clothed with vegetation. Although difficult to quarry and hard to dress, it is one of the most valuable building stones known. It neither crumbles, weathers, nor crushes. Granite buildings erected centuries ago show almost no perceptible change. A cubic foot of granite weighs from 165 to 170 pounds. Sandstone weighs from 130 to 160 pounds. In estimating the value of quarry products, our granite industry ranks second—next to limestone.

It was formerly supposed that all granite rocks were formed before the deposit of any of the sedimentary strata, and hence they were termed "primitive rocks." But since it has been found that granite is associated with geologic formations of various ages, and that even since the beginning of the Tertiary epoch its intrusion among the Eocene strata of central Europe has raised the Alps more than 10,000 feet above the level of the sea, the granite rocks are no longer classed as primitive.

Granite appears, indeed, to be the fundamental rock of the earth's crust. Wherever we reach the base of the stratified rocks, we find them resting upon granite; and whatever the age of the strata thus lying on the granite, whether Chalk, Silurian, or of any other epoch, there is no

reason to suppose that below the granite there are other beds of older date; for although granite penetrates the stratified rocks, it has not been noticed to spread over them; so that wherever it occurs in a large mass, it is believed that no other rock lies beneath it. If we were to penetrate at any point through the stratified rocks that form the upper portion of the earth's crust, we would reach at their base a granitic rock; and in our progress still downward, the only change we would encounter would not be one of materials, but only of the condition of these materials from the influence of heat. There are appearances, however, which seem to indicate that some granites are true, though highly altered, sedimentary rocks.

Large expanses of the earth's surface are covered with granites; occasionally it is the superficial rock in flat, undulating plains, but it most frequently makes its appearance in mountainous regions, perhaps forming the axis of the mountain range, and thus being the cause of its elevation. It seems probable that granite has been raised from below as a solid, hardened rock; it has evidently, however, generally been in a fluid condition formerly, as is evidenced by the number of veins which are protruded from it into the adjacent rocks.

The varieties of granite depend upon the number and quantity of its mineral constituents, and upon the state of aggregation of these materials. Ordinary granite, as stated, is composed of feldspar, mica and quartz. The feldspar may be either the flesh-colored potash variety, albite, or both potash and soda may enter into its composition. The mica varies in color from a pure silvery white, through the more common brown, into black. The quartz is generally white, seldom dark-gray or brown. The predominance of one or other of the ingredients or of a particular variety, gives the peculiar color to the mass, which is generally either red, gray or white.

Granite is largely used as a building material in bridges and other engineering works, and also in public buildings and residences. The difficulty of working it makes it expensive, but this is counterbalanced by its durability. It cannot be easily cut, as can the majority of building stones, with machine saws, but may be worked first with large hammers, and then with pointed chisels, but the difficulty of cutting and polishing granite by the invention of polishing machines, and pneumatic tools have been decreased. The success of the ancient Egyptians in operating upon this refractory stone was extraordinary. They worked and polished it in a way which modern workmen cannot excel, if indeed they can equal; and not content with polishing it, they covered some of the blocks of granite with the most delicate and sharply cut hieroglyphics.

The granites best known for ornamental purposes in the United States are those obtained from Hallowell, Maine, from Fall River and Quincy, Mass., and from Barre, Vt. Hallowell granite is a white variety and Quincy furnishes a granite from which many handsome polished columns for public halls and other buildings have been constructed. The first railroad in New England was built at Quincy in 1826-27, and operated by horses, to carry granite for building Bunker Hill Monument in Boston.

In warm climates granitic soils, produced by the weathering of granite, are frequently very fertile, as the chemical composition of the stone contains the necessary elements. Its great hardness, however, and its resistance to atmospheric influences, usually prevent a granitic soil of any thickness being formed; and even where it exists, at least in temperate regions, it is generally so high and exposed that it is unfavorable to vegetation.

Granite City, Illinois, is situated on the Mississippi River, opposite St. Louis, and is served by the Chicago & Alton, the Chicago, Peoria & St. Louis, the Cleveland, Cincinnati, Chicago & St. Louis, the St. Louis Merchants' Bridge Terminal, the Wabash and other railroads. It is a busy manufacturing town and produces iron, steel, tin-plate and granite ware; there is also an extensive corn products refinery, bridge works, and a large sheet-lead mill. There are several modern business build-

ings, some fine residences, hospitals, a library, and a fine park.

Granite city was settled in 1892, and is governed by a mayor and a council, under the charter of 1896. Population, 1920, 14,757.

Grant, Frederick Dent (1850-1912), an American soldier, the eldest son of Gen. Ulysses S. Grant, was born in St. Louis, Mo. When a boy he was with his father in several of the battles of the Civil War, and was wounded at Vicksburg. He graduated from West Point in 1871, and was assigned to the Fourth Cavalry as second lieutenant. During a leave of absence he was employed by the Union Pacific railroad as a civil engineer. From 1873 to 1879 he served under General Sherman in the Indian Wars, in 1881 resigning from the army. In 1889 President Harrison appointed him Minister to Austria, and upon returning to the United States, he was police commissioner of New York City, serving from 1894 to 1898. When the Spanish-American War broke out, he reentered the army as colonel of the 144th New York Volunteer Infantry, and in 1898 was appointed brigadier-general United States Volunteers. He was afterwards in command of the District of Cavite and Northern Luzon, Philippine Islands; in 1902 he was placed in command of the Department of Texas, and later of the Department of the Lakes, and the Department of the East. He was made major-general in 1906. General Grant died of the same disease as his father, cancer, April 12, 1912.

Grant, Robert, (1852-), an American writer of novels and essays, was born in Boston. He was graduated from Harvard in 1876, and from the Harvard Law School in 1879. In 1893 he was appointed judge of the Probate Court of Suffolk County, Mass. He has held this position continuously, and since 1895 has been overseer of Harvard University.

He became interested in literature and wrote both novels and verse, though his earliest books that were published showed little talent. His work improved rapidly, however, one of his well known books being *Unleavened Bread,* which was published in 1900. Other works that have been well received are *The Carletons, An Average Man, The Knave of Hearts, A Romantic Young Lady, Face to Face, The Bachelor's Christmas and Other Stories, The Undercurrent, The Orchid, The Chippendales* and *The Convictions of a Grandfather.*

Grant, George Monro (1835-1902), a Canadian author, orator, and college president. He was born at Albion, Nova Scotia, and received his higher education at Glasgow University. When twenty-five years old he was ordained a Presbyterian minister and three years later took a pastorate at Halifax. In 1877 he was made principal of Queen's University, Kingston, and served in that capacity till his death. Dr. Grant gained wide fame as a preacher. He was a strong supporter of the movement to unite the separate divisions of Canada into the present Dominion, and also promoted the union of the Presbyterian churches of Canada. Aside from his political writings his best-known book is *Religions of the World in Relation to Christianity.*

Grant, Ulysses Simpson (1822-1885), the eighteenth president of the United States. He was born at Point Pleasant, Ohio, April 27, 1822, and died at Mount McGregor, New York, July 23, 1885. As a boy he was remarkably fond of horses. He taught his father's horses to pace, but could not be induced to train horses for others. One neighbor hit upon a device. Knowing Ulysses had a long trip to make he managed to loan him a saddle horse and was rewarded for his shrewdness, for it came back well broken to pace.

At the age of seventeen young Grant went to West Point. He stood well in mathematics and ranked about midway in a class of thirty-nine. He preferred the cavalry service, but was made second lieutenant of infantry and was ordered to Jefferson Barracks at St. Louis. Here he made the acquaintance of Julia Dent who became his wife. In 1844 he was ordered to Natchitoches, Louisiana, then a frontier town. He went through the Mexican War creditably. Though he himself says he was much afraid under fire he was

complimented for bravery and was promoted twice for coolness and efficiency.

In 1854 he resigned from the army and went to St. Louis to live with his wife and children on a small farm given him by Mrs. Grant's father. It lay ten miles outside of the city. Grant built a log cabin with his own hands, cleared land, hauled cordwood to market, planted corn, and did his best to maintain himself as a farmer. In 1860, becoming discouraged by hard labor and small returns, he turned his back on "Hardscrabble," as he called the place, and moved to Galena, Illinois, where he entered a leather store established by his father who owned a tannery.

Here the outbreak of the Civil War found him. He interested himself in raising troops. The neighbors wanted him to take charge of a local company, but he declined, and was soon offered a regiment. His skill in the handling of troops was so evident that President Lincoln made him a brigadier-general.

His first campaign was undertaken in 1862. With 20,000 men he marched south to open up the Cumberland and Tennessee rivers. With the assistance of Commodore Foote and his gunboats he reduced Fort Henry and invested Fort Donelson. His old West Point classmate, General Buckner, in command of the defense, wrote asking for terms. Grant replied, "No terms except an unconditional and immediate surrender can be accepted. I propose to move immediately upon your works." Buckner, in no condition to prolong the defense, surrendered. "Unconditional surrender" caught the ear of the North and made Grant popular. The next year Grant ran his gunboats past Vicksburg, marched his army past the land side of the fortress, defeated Johnston and Pemberton, and received the surrender of Vicksburg July third.

Grant's promotion was rapid. He was made commander of the department of the Mississippi. At Corinth he was almost whipped, but his reputation was sustained by Lookout Mountain and Missionary Ridge. President Lincoln had admiration for the man who went ahead and accomplished something without complaining or wasting his energies in calling for more troops. A deputation came in one day to protest against the retention of a man who drank whiskey, as Grant was said to do. The president, whose sympathies would ordinarily have been with their views, looked sober for a moment; then asked them with a twinkle in his eye where he could get some of Grant's whiskey for his other generals.

As confidence in his military skill grew Grant was made commander of all the military forces of the North. He received the surrender of General Lee and the Army of Virginia at Appomattox Courthouse April 9, 1865. It is characteristic of the simplicity and thoughtfulness of the man that he directed the Confederates to keep their horses and use them in planting crops. He rejoiced in the preservation of the Union, but was too large hearted a man to take a petty delight in the distress of his opponents.

In 1868 he was the popular choice, we may say, of the Republican party for the presidency. He was reëlected in 1872. His political life is the least satisfactory part of his career. Himself a man of integrity and kindness, his administration was marked by the outrages of "carpet baggers" in the Southern States, and he himself was beset and surrounded by corrupt officeholders without patriotism or principle, who disgraced the government by dishonest practices.

After retiring from office Grant made a tour of the world. He was received as the first of Americans and returned delighted with his reception. He was led to be a candidate for a third term, but was not successful in gaining the nomination. This mistake annoyed him, and he was further humiliated by the discreditable failure of a business firm in which his name appeared and in which he had a nominal interest. Although in no way responsible for the failure he turned over every dollar he had and looked the world in the face a beggar.

Friends insisted on making up a purse. A publishing firm urged him to undertake the writing of an autobiography. This he set about. A malignant cancer appeared, but he wrote on under the very shadow of death, revising proof, even after

the disease had deprived him of his power of speech. This autobiography is remarkable for its modesty, simplicity, and fairness. It carries with it the conviction that it was written by one trying to tell things as they were.

His death occurred at Mt. MacGregor, near Saratoga, New York, July 23, 1885; and a grand mausoleum overlooking the Hudson in upper New York City marks his resting place. It is a noted spot and is visited by thousands annually.

The centenary of General Grant's birth was celebrated on April 27, 1922. Exercises were held in the public schools throughout the country. In Washington, D. C., the memorial statue by Shrady was dedicated, and at Grant's Tomb in New York, Marshal Joffre made an address.

Grape, a tendril-bearing, climbing vine. The grape of history is the wine grape of the Old World, native, it is thought, to Asia. The sour grapes that Aesop's fox failed to reach were, no doubt, of this sort. Grapes are raised in Europe, mainly for wine and raisins; in the United States, chiefly for table uses. The grape was, no doubt, the first fruit brought under cultivation. It has a wide range. In the southern hemisphere, grapes thrive and are raised in quantities in Peru, Cape Colony, New South Wales, Algeria, and in all the Mediterranean countries.

Grape growing in the United States was first tried with the European wine grape, without success. Mildew and a small insect called phylloxera (fĭl-lŏx-ē′-rà) proved such determined enemies that the attention of Americans was turned to our native grapes, of which the United States has at least two dozen kinds. By improving the Northern fox grape, gardeners have obtained the Isabella, the Concord, the Catawba, and most of our cultivated varieties. From the Southern fox grape, or muscadine, we have the Scuppernong. The Delaware grape is considered a hybrid.

The chief three regions of grape culture in the northeastern fourth of the United States are the lower part of the Hudson Valley, the region of lakes in northwestern New York, where the "Five Nations" used to live, and the Lake Erie region of New York, Pennsylvania, and Ohio. The valley of the Ohio is also an important grape region. California raises the wine grape. Grapes are raised in nearly every state of the Union.

Formerly the moist atmosphere of a lake shore or a river bank was thought necessary for grape culture, but experience has shown that these localities are favored by freedom from late and early frosts, rather than by any special quality of water or air. With proper care, grapes grow in soil varying from gravelly sand to a stiff heavy clay, and in almost any locality where the season permits dent corn to mature. According to an early notion, derived probably from the vine-clad slopes of the Rhine, the vine required a precipitous hillside, where the roots of one row of plants were exposed to the sun's rays over the top of the vines on the next lower level; but here again experience has shown that level land is quite as advantageous for growth if the rows be far enough, say nine feet, apart. Level ground is greatly to the advantage of the grape grower.

Europeans train vines to a stake; the American system is that of tying vines to a trellis made of wires stretched at length from post to post, with vines about eight feet apart in the row. In either case the object is the same, to raise the fruit from the ground and give it plenty of air and sun.

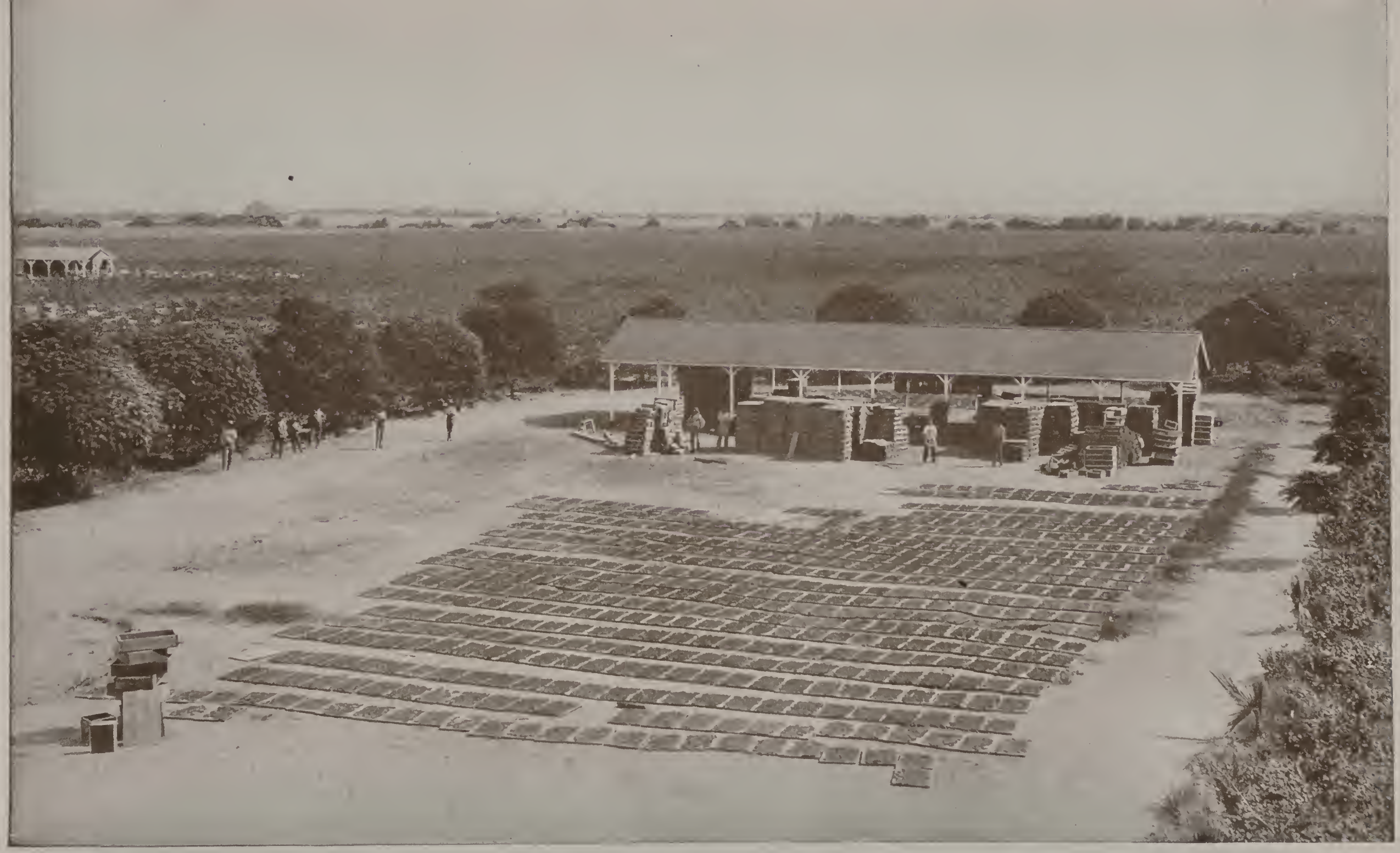
Grape raisers give three principles to be observed in pruning vines.

1. Fruit is borne on wood of the present season which arises from wood of the previous season. A shoot of 1905 makes a number of buds. In 1906 these buds make shoots, on the bases of which clusters of grapes grow. Only strong buds, on hard, well matured cane (not old wood though), will produce such cluster-bearing shoots.

2. A vine should bear only a limited number of clusters, say from thirty to sixty.

3. The bearing wood should be kept near the original trunk or head of the vine. Wild grapes soon grow out of reach.

VINEYARD SCENE, HERMAN, MISSOURI



FRUIT DRYING IN NEW MEXICO

With these ideas in mind, the pruner cuts away the larger part of each year's growth, reserving a few hard, well ripened canes, shortened until the entire plant carries from fifteen to twenty buds only. Pruning should not be done during the growing season.

Grapes are grafted readily. To avoid bending by wind the vine is cut off a few inches below the surface of the ground and a cleft graft is inserted in the stump. This work must be done before the sap starts in the spring. Grape plants are usually started by cuttings. Well matured cane is cut into slips with about three buds each. The slips are inserted in mellow soil until the upper bud is at the surface of the ground. In cold climates vines must be laid down and covered in the fall to prevent thawing on warm days. It is not freezing, but thawing and freezing, that kills vines. If soil be too rich, the plants will run to vine instead of fruit. The cost of plowing, planting, cultivating two seasons, building trellises, and training vines is put at $70 to $80 per acre in the grape country of New York, and the yearly cost of maintaining and harvesting a bearing vineyard is reckoned at from $20 to $25 per acre. A careful grower aims to produce four tons of Concords to the acre, but has to be satisfied with half the yield.

Nearly all communities largely interested in grape growing have some sort of a fruit-selling association. In this way a manager can avoid flooding one market with fruit while another market is temporarily undersupplied. One of the problems of grape culture is the disposition of an unusually large crop. Of late efforts have been made to take care of surplus grapes by bottling unfermented grape juice for the market. Many fruits are the better for early picking, but grapes do not ripen after they are removed from the vine and are deprived of sun and air.

The difficulty found in raising the wine grape in the North and South has been mentioned; but from Texas westward no such condition exists. Grape vines from Europe, probably from Spain, were introduced by the missions at an early date. California now raises Old World grapes in enormous quantities. In 1920 California had 153,195,213 vines of bearing age and 21,388,646 not of bearing age, and in 1919 this state produced 2,055,644,612 pounds of grapes.

California growers prune close into a bush shape and dispense with stakes and trellises. In order to prevent disease, the wine grape is grafted on a native root.

Owing to the presence of a large amount of grape sugar, an easily digested sweet, grapes are considered highly nutritious.

See WINE; RAISIN; CONCORD; CATAWBA; SUGAR; MUTATION.

Grapefruit, a dessert fruit, having the shape of an orange with the sourness and color of a mild lemon. The grapefruit is considerably larger than the orange. Its only claim to the name lies in the large clusters in which it hangs on the tree. A native of southeastern Asia, it is cultivated in India, Florida, the West Indies, and California. The tree is somewhat larger than the orange tree. It requires much the same treatment but it is even more sensitive to frost. In Florida the fruit is known as the pomelo. The grapefruit is related to the lemon and the orange but it is not a cross between them. See LEMON; ORANGE.

Grape-Sugar. See SUGAR.

Graphite, grăf′īt, or plumbago, a form of pure carbon. Impure graphite contains from 1 per cent to 47 per cent of alumina. Graphite occurs in shiny, iron-gray scales or flakes, having an unctuous or greasy feel. Graphite is put to many uses in the arts. Being a good conductor of electricity, it is used for coating the surfaces of molds in making electrotypes. As it cannot be melted it is mixed with clay for use in making crucibles and portable furnaces. As it does not rust, it is used for burnishing iron. It is the foundation of metallic stove polish. Being entirely free from grit, graphite is used in place of oil to lubricate the bearings of machinery. The finest quality of graphite, chiefly from a mine in Siberia, is ground into a paste and molded into needle-shaped pieces for lead-pencils. It makes a black mark when rubbed on paper, resembling lead in this respect. For this reason, no

doubt, it is called black-lead, but it is well to remember that black-lead is carbon, not lead at all. A coarse graphite is obtained from Ceylon. Other foreign sources of supply are mines in Japan, Russia, Germany, and Austria. Canada produces graphite. The United States produces about $2,000,000 worth a year for the coarser purposes from mines in Pennsylvania, New Jersey, Michigan, and Wyoming. American pencil graphite is obtained chiefly from Ticonderoga, New York. We import over half a million dollars' worth each year, chiefly for the manufacture of fine lead-pencils. Of late graphite has been obtained by artificial means. Anthracite coal is converted into graphite in an electric furnace. It is said that 3,000,000 pounds of graphite a year are made in the United States by this process.

The overheating of a carborundum furnace at Niagara Falls led to the discovery of artificial graphite, which is in many ways superior to the natural product. Pure carbon alone does not change into graphite on heating, as it must first be changed to a carbide of some metal. To accomplish this anthracite coal with 8/10 per cent of ash evenly distributed through it is used. This material may be molded into the desired shape and made into graphite, or it may be graphitized and then molded, the product being 99.5 per cent pure graphite, due to the volatilization of other material at the high temperature of the furnace. Recently the use of this graphite for electrodes has been so perfected that it is now possible to screw a new electrode on to one end of the old one without interrupting the process. Electrodes with a diameter greater than 17 inches are now made. The process for making both carborundum and graphite were invented by E. G. Acheson of Niagara Falls.

The graphite, which consists almost entirely of carbon, used in making pencils, has been employed for this purpose since the seventeenth century, and for a long time was obtained almost exclusively from the Borrowdale mines in Cumberland, England. It was mined in compact gray-black masses, cut into thin plates, then into rectangular sticks and cased in wood. The mine was guarded by an armed force, and to maintain its monopoly an act of Parliament was passed restricting the working to only six weeks in the year for the remainder of the time the mine was flooded to prevent theft. The best quality was exhausted early in the nineteenth century, and the pencil manufacturers then turned their attention to using accumulations of waste from cuttings of the original masses of graphite, which were crushed and mixed with other materials.

One of the results of such experiments was the introduction of varying degrees of hardness in pencils, in which respect the Cumberland graphite was never uniform. Conté, of Paris, is credited with the method now generally employed, of making pencils from finely ground graphite mixed with varying proportions of clay, allowing for fourteen degrees of hardness and softness, ranging from 6H to 6B, with HB (hard and black) and F (firm) as the middle degrees.

Graphite has since been found in many parts of the world. The Ceylon variety is crystalline, but is not sufficiently black for pencil-making. The massive variety, which occurs in Bohemia, Bavaria and Mexico, is much blacker. It is ground very fine, mixed with water, and passed through tanks to allow the heavier particles to fall, the finer particles passing on to five or six successive tanks, when, the necessary degree of fineness having been obtained, it is mixed with suitable clay which has been washed in the same manner. The mixture is submitted to further grinding, squeezed in bags to remove superfluous water, and forced through tubes to produce strips of the required shapes and sizes, which when dried and baked are ready for casing in wood.

When used as a lubricant, either massive or crystalline graphite may be utilized, but should be free from grit. For the manufacture of crucibles, Ceylon flake graphite is preferred. In recent years a mixture of graphite and grease has been successfully substituted for red lead. Most of the graphite used in making paint is of the irregularly shaped, or amorphous, vari-

Sweet vernal grass.

Nard or mat grass.

Bermuda grass.

Reed grass.

Red top.

GRASSES.

ety. The graphite imported by American pencil-makers is chiefly supplied by deposits at Sonora, Mexico. An excellent graphite is obtained near Ticonderoga, N. Y. Natural graphite is always found mixed with other materials, and after being mined is therefore crushed and subjected to a cleaning or concentration process. The separation of the graphite is accomplished by means of water or an air current, the latter being most frequently used.

Twenty-four establishments in the United States were engaged in the production of ground and refined graphite in 1920, and the product for the year was valued at $2,239,587. The manufacture of lead pencils, however, amounted in value to nearly $25,000,000, and engaged the services of 5,970 employees, in twelve factories. But these figures by no means represent the real importance of graphite in industry, as it is employed in so many different arts and manufactures. See PENCIL.

Graphophone. See PHONOGRAPH.

Grass, the most useful family of plants. While it is true that in a torrid climate people could exist on breadfruit and water, it is still true that the family of grasses does more to support human life and is more nearly indispensable than any other family of plants within or without the tropics. Wild grasses, timothy, redtop, blue grass, wheat, oats, rye, barley, rice, Indian corn, broom corn, sorghum, reeds, cane, and bamboo are grasses. Grasses may be told from sedges by their stems. Grass stems are usually round, hollow, and jointed, with leaves or blades growing on two sides. Sedge stems are usually three-angled, solid, without joints, and with leaves or blades on three sides. Sedges resemble grasses and are cut for hay, but they are not considered valuable.

Timothy and redtop are the most valuable of the forage grasses. Kentucky blue grass, which extends its range far into Canada, is the best American pasture and lawn grass. A running, underground, fleshy root-stock enables it to extend in hard ground and to withstand drought. When dry weather has killed the plant proper and the pasture is to all appearances dead, these thread-like fleshy root-stocks lie quiet like potatoes in a cellar, only to send up a carpet of green with marvelous quickness after a refreshing rain. So far as withstanding drought is concerned, it is better not to sprinkle often. Frequent surface sprinkling induces the root-stocks to lie near the surface where they may be killed by the hot sun of a few days neglect. Blue grass grows early and grows late. It is a boon to cattle and to dairy interests. Bermuda grass is the best in the South.

See also separate articles on the chief members of the family as OATS; BAMBOO; ESPARTO; TIMOTHY GRASS; BLUE GRASS.

Grass Cloth, a thin fabric of a brownish color made in China and India from ramie or rhea fiber. The name was given to it by the English residents of Canton. A light cotton fabric of buff color made in America in imitation of the Chinese cloth is called grass cloth.

Grasshopper, an insect allied to the locust, cricket, and katydid. The dusty jumpers commonly called grasshoppers are locusts. The common grasshoppers of the meadows may be known from locusts by a green, transparent body and a pair of long, slender, delicate feelers which extend forward, or backward in some species beyond the tip of the abdomen. In general, the life of the grasshopper is like that of his shorthorned relative, the locust, to the article on which the reader is directed. We add an extract relative to the grasshopper, from each of two rival sonnéts, the first by Keats, the second by Leigh Hunt:

The poetry of earth is never dead:
When all the birds are faint with the hot sun,
And hide in cooling trees, a voice will run
From hedge to hedge about the new-mown mead:
That is the grasshopper's—he takes the lead
In summer luxury,—he has never done
With his delights; for when tired out with fun
He rests at ease beneath some pleasant weed.

Grattan, Henry (1746-1820), a famous Irish patriot and orator. He was born in Dublin, and was the grandson of the Chief Justice of Ireland. When twenty-three he was graduated from Trinity College, and then studied at the Middle Tem-

ple, London, one of the three great English law schools. In 1772 he was admitted to the bar in Ireland. His law practice, however, was second to his interest in oratory, which he studied and practiced until he attained a wonderful command of English. At that time Ireland was in a wretched condition politically and otherwise; her Parliament though nominally a legislative body, was but a center for the discussion and spread of political ideas. Grattan was elected to it in 1775 and made it a medium for working out his reforms. Though he never attained the desire of his heart for Irish home rule, he secured a number of reforms that bettered the condition of his countrymen greatly. He withdrew from the Irish Parliament in 1798, before a bloody rebellion against England, but reentered in 1800 to oppose the union of Ireland and England under one Parliament. Failing to prevent it, he withdrew for a while from public life, then entered the English Parliament in 1805 in order to work for the relief of Irish Catholics. Though a Protestant himself Grattan was devoted to the Catholic cause of Ireland, trying for fourteen years to remove the abuses the English Parliament had imposed. His death was directly due to a journey to England, made against his physician's orders, for the purpose of supporting a bill to aid the Catholic cause.

Gravitation, a universal force existing in nature. The law of universal gravitation was enunciated first by Sir Isaac Newton. Every particle of matter in the universe attracts every other particle with a force proportionate to the product of their masses and inversely proportionate to the square of their distance apart. According to this principle, two masses with weights of 3 and 4 at a distance apart of 1 would attract each other with a force of 3×4 or 12. The same masses at a distance apart of 2 would attract each other with a force of 12 divided by the square of 2, which would give an attractive force of 3. At a distance apart of 3 they would attract each other with a force of 12 divided by the square of 3, which gives 1 1-3. The earth, like all moving bodies, tends to go in a straight line in whatever direction it happens to be moving. Were it not for gravitation, the path of the earth would be a straight line, and we should in time get so far from the sun that all life would be frozen. The attraction of gravity, however, draws the earth toward the sun. The two forces counteract each other. Instead of falling toward the sun or going off in a straight line, we take an intermediate direction which carries us round and round the sun ceaselessly. The fixed stars, some of which are larger that the sun even, are too far away to affect the earth's course sensibly. The earth draws the sun with a force equal to that with which the sun draws the earth, but the sun is so heavy in comparison with the weight of the earth that the sun scarcely budges, while the earth does the falling. Gravitation refers to the attraction of gravitation between the earth and bodies near its surface. See WEIGHT.

Gravity, Specific, the weight of a given substance as compared with that of an equal bulk of some other substance taken as a standard. The standard for solids and liquids is water; for gases, air or hydrogen. Thus, when we say the specific gravity of alcohol is .81 and silver 10.4, we mean that a cubic inch, for instance, of alcohol, weighs .81 as much as a cubic inch of water; and that a cubic inch of silver weighs 10.4 as much as a cubic inch of water. The comparative weights of a number of common substances are given in the following

TABLE OF SPECIFIC GRAVITIES.

Agate	2.6	Ice	.9
Alcohol (grain) 0°	.81	Iron (cast)	7.2
Alum	1.7	Iron (wrought)	7.7
Aluminum	2.7	Ivory	1.9
Arsenic	5.7	Lead	11.3
Beech	.8	Marble	2.7
Benzine, 20°	.87	Mercury, 0°	13.596
Boxwood	.9	Mica	2.8
Brass	8.3	Milk, 0°	1.032
Bricks	1.7	Olive oil, 0°	.92
Bronze	8.8	Paraffine	.9
Copper	8.8	Platinum (wire)	21.4
Cork	.24	Quartz	2.6
Diamond	3.5	Rock salt	2.2
Emerald	2.7	Sea water, 0°	1.026
Feldspar	2.5	Silver	10.4
German-silver	8.5	Slate	2.8
Glass (crown)	2.5	Steel	7.8
		Sulphur	2.0

Glass (flint)	3.6	Tallow	.9
Gold	19.3	Tin	7.3
Granite	2.7	Turpentine, 0°	.89
Graphite	2.3	Zinc	7.1

Gray, Asa (1810-1888), an American botanist. A native of Paris, Oneida County, New York. He was educated at Fairfield College for medicine, and later became an assistant of the noted botanist, Torrey, at the New York College of Physicians and Surgeons. In 1842 Gray was appointed Fisher professor of natural history in Harvard University, from which he retired in 1873. Dr. Gray was in charge of the best equipped department of botany in the United States at a time when the cataloguing of newly discovered plants was active, especially of plants from the western part of our country. He had the pleasure of naming hundreds of plants new to science, and did much to popularize the study of botany.

Among his writings are several text books, notably *How Plants Grow, Lessons in Botany*, and *Manual of Botany*. A number of important papers in the Smithsonian publications deal with collections of plants from the west and southwest. His *Botany of the United States Pacific Exploring Expedition* is a report on the plants collected by that expedition (1854).

Dr. Gray's classifications of plants stand critical study well. He arranged his keys and *Manual,* beginning with buttercups and proceeding to the lower orders last. This order has been reversed by later writers. Gray and Torrey designed a complete manual of the plants of North America but left the work incomplete.

Dr. Gray's collection of plants, now known as the Gray Herbarium, has a building of its own in the botanical garden of Harvard University. It is one of the most important collections of plants in the world. It contains many original specimens from which species were named. With recent additions, the Gray Herbarium now contains over 385,000 sheets of mounted specimens. See BOTANICAL GARDEN; LINNAEUS.

Gray, George (1840-), an American jurist and legislator who rendered signal service to his country as a member of many boards of arbitration, was born at New Castle, Delaware, and was educated at Princeton and Harvard universities. Admitted to the bar in 1863, he practiced at New Castle and at Wilmington, Delaware. He was attorney-general of Delaware from 1879 to 1885, was elected to the Senate in the latter year, and was appointed judge of the United States Circuit Court in 1899. In 1898 Judge Gray was a member of the Joint High Commission between Canada and the United States, was chairman of the Anthracite Coal Strike Commission in 1898, and a member of the North Atlantic Fisheries Arbitration of The Hague in 1910. He resigned as circuit judge in 1914. In 1915 Judge Gray was appointed peace commissioner to Great Britain, and chairman of the American delegation to the Pan-American Scientific Congress; and in 1916 was made a member of the American-Mexican Commission.

Gray, Thomas (1716-1771), an English poet. He was born in London. His father was a scrivener, but was indolent and neglected his wife and children. The mother supported the family by keeping a millinery shop. Of twelve children Thomas was the only one who lived to grow up. He entered Eton at the age of eleven, where his uncles, Robert and William Antrobus, were assistant masters. He spent several years at Cambridge, but left without taking a degree. He had intended to study law, but gave it up to travel with Horace Walpole. His letters while on the continent are of great interest, although they were not intended for publication. After two years abroad Gray returned to Cambridge. He spent his time reading Greek prose and verse and in writing, but was very slow to publish. In 1747 his first production to appear in print was published. It was the *Ode to Eton College*. Gray never wrote for money, but for his own pleasure and that of his friends. He published when friends and booksellers could persuade him to do so. In 1753 Walpole prepared a handsome edition of six of Gray's poems with drawings for head and tail pieces and initial letters by Bentley. Gray insisted that this be published under the title,

"Designs by Mr. R. Bentley for Six Poems by Mr. T. Gray." Gray's poems betoken a man of delicate thought and refined taste, fond of learning and art. His fame rests almost solely on his *Elegy Written in a Country Churchyard:*

The curfew tolls the knell of parting day,
The lowing herd winds slowly o'er the lea;
The plowman homeward plods his weary way
And leaves the world to darkness and to me.

Grayling, a slender fish of the salmon type. It is from twelve to eighteen inches in length. It has large scales and a narrow mouth with small teeth. It has the habits of the trout. The European grayling is found in the cold, pebbly streams of England, France, Italy, Switzerland, and Scandinavia, but is not found, it is said, in Ireland and Scotland. In his picture of the *Brook,* Tennyson speaks of

Here and there a lusty trout,
And here and there a grayling.

A North American species, known as the blue fish by northern trappers is abundant in the cold, clear streams of the Mackenzie Valley and in Alaska. Another grayling is found in northern Michigan and the ice-born streams of Montana. They are fine game fish. They are mistaken readily for trout. See SALMON.

Greasewood, a name applied to a number of thorny shrubs characteristic of strongly alkaline soils. The common greasewood of the west extends from the upper waters of the Missouri and the Platte rivers to the Gila, and westward to the Sierra Nevadas. It grows from four to eight feet high with a wealth of narrow leaves on the young branches. It is a companion of the salt sages, and thrives in soil too alkaline for wheat or alfalfa. A smaller form is found in the southwest from Texas to California. Greasewood is better than no vegetation. It relieves the barren aspect of a region, and its twigs afford some pasturage for cattle. See WORMWOOD; ALKALI.

Great Basin, in North American geography, a large area of interior drainage lying between the Wasatch Mountains and the Sierra Nevada. It has no outlet to the sea. It lies in Utah, Nevada, California, Idaho, and Oregon. Its general shape is triangular, with its base at the north. Its area is about 212,000 square miles. There are a number of salt lakes, each receiving streams. The largest is the Great Salt Lake. The largest river in this region is the Humboldt. There is little rainfall. Three regions of the basin are known respectively as Great Salt Lake Desert, The Mohave Desert, and the Black Rock or Carson Desert. A large part of the soil is of volcanic origin, for want of rain almost destitute of vegetation. The chief source of wealth is mineral. Iron, copper, silver, and gold exist in quantities. If water could be had for purposes of irrigation, this great region would become a garden spot of the world. See GREAT SALT LAKE; ALKALI; IRRIGATION.

Great Bear. See CALLISTO.

Great Bear Lake. See MACKENZIE.

Great Britain, the largest of the British Isles—the largest and the most important island of Europe. It is divided into England, Wales, and Scotland. The term is used, though incorrectly, as synonymous with England, just as America is used as synonymous with the United States. The term grew in favor after James I became king of England as well as Scotland. From 1707 until 1801 Great Britain was the official designation of the kingdoms of England and Scotland. In order to include Ireland, the official name was changed to the United Kingdom. Great Britain is a historical and geographical term; but, like America, it does not designate a political country. It is said that the fleet of the Roman Agricola was the first to sail around Great Britain, thus proving that it is an island. See ENGLAND; WALES; SCOTLAND; IRELAND; UNITED KINGDOM; CHALK; NORTH SEA.

Great Eastern, an immense iron steamship. This ship was built on the Thames in 1854-58 for the Australian trade. The equipment included both paddlewheels and screws. Though exceeded in size by screw propellers built since, the dimensions were something remarkable. The Great Eastern was in its day the largest craft ever afloat. Length, 680 feet; breadth, 82 feet, or including paddlewheel, 118 feet; height, or depth from deck to keel, 58 feet. There were five iron masts and one of wood.

Seven thousand square yards of sail were carried to aid eight engines. The smoke funnels were 110 feet high and 6 feet in diameter. The interior was divided into eleven water-tight compartments.

The hull was designed to carry coal enough for a voyage to Australia and return, besides 1,000 emigrants and freight enough to bring its owner a fortune. The ship was so bulky that it cost three months of time and $300,000 to get it from the shipyard into deep water. On the trial trip an explosion of steam pipes brought the voyage to an end ere out of sight of land. A number of trips were made across the Atlantic to New York. Considerable speed was developed. The ocean voyage was reduced to eleven days, but the cost of coal and repairs exceeded the receipts from freight.

The British government employed the Great Eastern to transport troops. The decks and cabins were capable of accommodating 5,000 men and officers. The steadiness of the ship and its enormous storage and carrying capacity led to its employment in laying the Atlantic cable. It was also used in paying out cables in the Mediterranean and the Red Sea. At the conclusion of this service the ship was degraded to the rank of a coal hulk in the harbor of Gibraltar. It was finally brought back to England and exhibited as a curiosity, a charge being made for admission. In 1888 it was brought to Liverpool, sold to the highest bidder, and broken up for old iron. It brought $280,720.

See STEAMSHIP; CABLE.

Great Falls, the county seat of Cascade County, Montana. The site was occupied by settlers in 1884. The city was incorporated in 1888. The population in 1920 was over 14,000. The falls of the Missouri River afford excellent water power. Flour, furniture, implements, vehicles, and woolen goods are produced. There are extensive grazing, agricultural, and timbered tracts in the vicinity. There are valuable sandstone quarries and mines of iron, coal, lead, silver, copper, and gold. Smelting is the chief local industry. The chimney of the smelter plant of the Boston and Montana Consolidated Copper and Silver Mining Company is the largest in the world. In fact, it is exceeded in height by four edifices only—two skyscrapers in New York City, the Washington Monument, and the Eiffel Tower. The shaft stands on a hill and rises 506 feet above the foundation. The inside diameter is 50 feet at the top. The walls are 66 inches thick at the base and 18 inches at the top. The builder set up a brickyard for his own use. The foundation required over 5,000 barrels of cement and the chimney proper required about the same number of barrels of lime. Two hundred thousand feet of timber were required for scaffolding. The structure was built inside of a year and cost nearly $250,000.

Great Lakes, the chain of lakes along the border between the eastern United States and Canada. They contain over 5,000 cubic miles of water; they have a combined surface area of 94,000 square miles; and constitute the greatest body of fresh water in the world. At one time, during the existence of a huge ice sheet, a glacier filled the present gorge of the St. Lawrence and dammed back the water. The Great Lakes then formed one sheet of water, a vast inland lake, the borders of which may be traced in the United States and Canada. The waters were discharged by way of the Mohawk Valley and the Hudson. The old outlet started near Rome, New York, on the southern shore of Lake Ontario. The present shore line is about 4,000 miles in length. The total water-shed comprises about 260,000 square miles. The depressions in which the lakes lie were caused by a settling of the earth's crust it is thought, due to the weight of glacial ice. By treaty agreement neither the Dominion of Canada nor the United States may maintain war vessels on the Great Lakes, nor erect fortifications on the shores. By permission of Canada the United States during the World War maintained fifteen training ships on the lakes. These ships could carry 600 men and 70 guns. See SUPERIOR; ONTARIO; MICHIGAN; HURON; ERIE; SAULT STE. MARIE; NIAGARA, etc.

Great Lakes, Fisheries of. The following statistics are taken from a preliminary report of the census bureau for a recent year:

	Number.	Value.
Independent fishermen ...	4,402	
Wage-earning fishermen ..	4,131	
Vessels	319	$858,669
Outfit (bait, fuel, provisions, etc.)		175,428
Boats	3,956	617,042
Apparatus of capture, total		1,830,840
Fyke and hoop nets..	4,685	120,280
Gill nets	146,991	959,110
Lines		22,830
Pots, crawfish	13,290	3,290
Pound nets	5,435	684,810
Seines	656	33,910
Trammel nets	530	2,350
Miscellaneous		4,260
Shore & accessory property		1,074,980
Cash capital		257,080
	Pounds.	Value.
Products, total		$3,767,370
Black bass	44,700	6,050
Brook trout	18,000	6,280
Carp, German 10,152,100		194,260
Catfish and bullheads..	962,500	49,900
Chub or kieye	489,900	22,660
Drum	1,489,800	15,550
Herring 40,627,900		966,100
Ling or lawyer	228,200	2,770
Perch, yellow	6,930,100	208,370
Pike and pickerel.....	2,141,800	136,070
Pike perch 15,114,900		568,860
Sturgeon, inc. caviar..	271,100	44,070
Suckers or mullet	7,257,500	166,980
Trout 12,027,100		800,100
White bass	224,100	10,790
Whitefish	7,724,500	524,650
Frogs	17,000	3,050
Crawfish	348,100	13,930
Mink & muskrat skins	45,500	14,790
Miscellaneous fish, etc.		12,140

These statistics are confined to the fishing industry and do not include wholesale fish dealers or canneries.

Great Plague. See BLACK DEATH.

Great Salt Lake, an inland lake in the northwestern part of Utah. It is about eighty miles long and from twenty to thirty miles wide. The surface is about 4,200 feet above sea level; yet the lake has no apparent outlet. Judging from beaches that rise, terrace after terrace, the lake was formerly much larger than it is now and discharged its water into the Columbia. At that time its greatest depth must have been about 1,100 feet. It is now not over 850 feet in depth. Large portions of the old shore have been irrigated and are now productive gardens, orchards, meadows, and fields. The water is salty,—so heavy with brine, in fact, that a person bathing is lighter than the water and cannot sink. The lake rises and falls with changes in the seasons. The salt in solution varies accordingly, being by weight from a seventh to a fifth of the whole. The waters are too salty for fish and are nearly without life. West of Ogden the Southern Pacific has expended $4,000,000 in constructing a long trestle bridge across the north arm of the lake. The bridge stands on 38,000 piles eight feet above water. The bridge shortens the line forty-four miles. See UTAH.

Great Slave Lake. See MACKENZIE.

Great Wall of China, a defensive wall following the northern boundary of China proper. It is the most extensive defensive work ever undertaken by man. It is said, on what authority we do not know, to represent the labor of 7,000,000 men for ten years. It was completed about 214 B. C., and was intended to put a stop to the invasions of the Tartar tribes. It extends from the vicinity of the sea, northeast of Peking, far into the desert northwest of China. It is 1,500 miles in length. It follows the natural contour of the country, rising over mountains, dipping down into valleys, and crossing rivers without a break. It differs greatly in construction. Some portions are little more than huge walls of loose earth and gravel. The typical construction, however, is thoroughly workmanlike in manner. The wall rests on a stone foundation twenty-five feet in width; retaining walls of brick, rising to a height of from fifteen to thirty feet, slope toward each other; so that the wall is about fifteen feet wide on the top. The space between these walls is filled in with earth and gravel; the top is paved with brick and defended by a parapet about six feet high with loop holes. The wall is further protected by strong towers at short intervals. The various roadways are spanned by massive arches of sufficient height to allow the passage of camels with their burdens. Portions of the wall are in ruins; yet other portions again are as firm apparently as when first built over 2,000 years ago. The paved roadway along the top of the wall is overgrown with weeds and grass. See CHINESE EMPIRE; TARTARS.

Grebe, grēb, a family of lobe-footed aquatic birds related to the loon, but much smaller. Grebes are famous divers and are able to swim with but the tip of the bill above water. In this way they seem to disappear marvelously. A grebe has the power of paddling so swiftly that, when lifted out of the water by hand, its feet move so rapidly that they form a mere blur, and cannot be distinguished apart. There are six species in North America, three of which are found in the northeastern part of the United States and Canada. They feed largely on fish. Their nests are masses of water-soaked, floating vegetation, built up in shallows or attached to rushes or grass. How eggs can be hatched in so wet a nest is a wonder. The mother grebe carries her young on her back. She uses her long neck in feeding them choice bits of minnows, snails, and tadpoles. When she thinks they should take to the water she gets them out on her wing, and gives them a flip, as from a springboard. The common grebe is also called the pied-billed grebe, dabchick, hell-diver, and water-witch. It is useless to waste powder on a grebe. It dives at the flash, long before shot can reach it. The flesh is as useless as that of the white-billed coot. See Coot; Loon.

Greece, a kingdom of modern Europe. It occupies the southern part of the Balkan peninsula and a number of adjacent islands. The southwestern portion is a peninsula, known as the Peloponnesus. It is connected with the mainland by the Isthmus of Corinth. In proportion to its area, Greece has a greater extent of seacoast than any other country of Europe. There are granitic rocks in the northern portion, but the greater part of the country is composed of hills of limestone. In places this limestone has been changed into exquisite marble. There are mines of iron, zinc, copper, lead, and silver. Coal of the variety known as lignite is mined. Salt, gypsum, sulphur, pumice, and a fine quality of emery are exported.

Climate. There is considerable diversity of climate. The upland regions have long, cold winters and hot summers. Districts near the sea have a milder and a more even climate. The soil of Greece, being composed of crumbling limestone, is fertile. Rain is lacking in the summer time. The country was once covered with forests but they have long since disappeared. Vales once described in literature as delightful shady glens are now rocky runs open to the glare of the sun. At a certain height above the sea level, oak groves set in. Over 8,000 tons of acorn cups are collected annually for use in tanning. Like those of Switzerland, the mountains of Greece, especially Mt. Hymettus, are noted for honey, figs, olives, and wine.

Products. Grapes thrive. The chief export crop is the small grape, which, when dried, produces the peculiar raisin known in commerce as a currant, from the city of Corinth, whence it was chiefly exported. Over $1,000,000 worth of currants are sent abroad each year. Among other exports are sponges, fish, butter, hides, olive oil, olives, soap, dynamite, powder, yarn, woolen and cotton cloth, silk, leather, thread, and glass. In the northeastern district, known as Thessaly, there are fertile plains producing about 7,000,000 bushels of wheat annually. The chief domestic animals are cattle, sheep, and goats. The coin of commerce is the drachma (plural drachmae). It is equivalent in value to the franc, being worth about nineteen cents, or, roughly speaking, five to the dollar.

Civilization. The Greeks were the most celebrated people of antiquity. Their civilization was later than that developed in the valleys of the Nile and of the Euphrates, but it preceded that of Rome. The origin of the Greeks is wrapped in obscurity. The early ruling element is believed to have been a people of German or Teutonic origin, who came down from the north, overthrew the cities of the native population, and made the early inhabitants serfs or helots, as they were known. The Greeks called themselves Hellenes and the territory they occupied Hellas. They called outsiders barbarians or babblers; that is to say, people whose language could not be understood. The term Hellas included not only the peninsula now known as Greece, but adjacent parts of Asia Minor.

THE MODERN GREEKS AND THE BALKAN PEOPLES

1. A Montenegrin
2. A Greek Soldier
3. A Group of Peasants, Greece

Religion and Mythology. All Greeks shared a common form of religious belief. They had a plurality of deities, each having his own province. Zeus, or Jupiter, as he was known to the Romans, was the father of gods and of men. He was the god of the sky. Hera, or Juno, the sister and wife of Zeus, was queen of the sky. Apollo, the sun god, was the deity of wisdom, poetry, and medicine. Athene, or Minerva, was the counterpart of Apollo. She was the goddess of wisdom. Poseidon, or Neptune, was the god of the sea. Hephaestus, or Vulcan, was the god of fire. Hermes, or Mercury, was the god of the wind. He was the swiftest messenger of the deities—the god to whom thieves looked for protection, and the promoter of commerce. Artemis, or Diana, was the goddess of the moon and of hunting; Aphrodite, or Venus, the goddess of love; Demeter, or Ceres, the goddess of the earth who gave bountiful crops. Hestia, or Vesta, was the goddess of the home or the hearth. Mt. Olympus was the home of the gods. Separate articles may be found on each of these deities. Literature is full of allusions to them. The mythology of the Greeks is the most wonderful of all mythologies. Every stream, spring, fountain, cave, precipice, grove, flower, constellation, the sunset, the dawn, the north wind, the south wind, the zephyr, had its myth or legend.

Early History and Government. Greek history begins to emerge from the mists about 1,000 B. C. The Greeks were never a nation in the modern sense of the word. There were four divisions, the Aeolians, Dorians, Achaeans, and Ionians. The chief city of the Dorians was Sparta, that of the Ionians, Athens. These divisions or races, as they were sometimes called, were subdivided into petty states. The state consisted of a city and its surrounding territory. The agricultural land belonged to owners who resided in the cities. Cultivation was carried on chiefly by helots. When a city became overpopulated, the inhabitants swarmed like bees from a hive and established a new and independent city. In this way Greek civilization spread eastward over the isles of the Aegean, along the shores of the Bosporus and the Black Sea, and along the coast of Asia Minor. Southern Italy and Sicily were occupied by Greek colonies. Tarentum and Syracuse were Greek cities. In spite of petty dissensions and local wars innumerable the Greek cities or states were held together by several influences. First of all were the surrounding barbarians, against whom it was necessary to unite for common defense. Then, too, they spoke the same language and listened to recitations of the same literature. They had a common religion and similar customs of worship. They consulted the same oracles and contested in the same games. Last of all, they listened for many centuries to the decrees of the Amphictyonic Council, a body without an army or a war chest, but whose decisions were enforced by public opinion.

The leading states were Sparta and Athens. The Spartans, who represented the Dorians, were a moderate, conservative state of warriors, under an aristocratic form of government. They lived in a fertile valley. The citizens were largely agriculturists. Their laws were severe. They lived plainly. The citizens of Athens were Ionians. They dwelt near the sea and engaged in shipping. They were a commercial, stirring, progressive, artistic sort of people. They replaced their aristocratic rulers or tyrants, as they were called, by a democratic form of government.

Greek Supremacy. For a time Athens was the greatest power in the world. Taking advantage of local jealousies between the large cities, which culminated in the battle of Chaeronea, 338 B. C., Philip, king of Macedon, a district only half Greek, succeeded in forcing himself into the Amphictyonic Council. Although opposed heroically by Demosthenes, the orator, he placed himself at the head of Greek affairs. His son, Alexander the Great, followed up his father's success and made himself master of the Greek world and converted Greece into a province of an empire. Under Alexander and his successors the empire of the Greeks was extended from Italy to Central Asia and the shores of the Indus. The political supremacy of Greece was of comparatively short duration As soon as the Romans

had brought the Punic Wars to a successful close they turned their attention to the Greeks. Greece proper became a part of the Roman empire, 146 B. C. When the Roman empire was divided Greece fell into the eastern half. In fact, Constantinople was an ancient Grecian colony.

Decline. During the early centuries of Roman and eastern or Byzantine supremacy, the Greeks were the most intellectual people in Europe. Learned Greeks with their parchment, pens, and inkhorns were in demand the eastern world over. In 1460 Greece was conquered by the Turks. With the exception of a short interval, when a portion of the country was ceded to the Venetians, it remained under Turkish control until 1830. Finally the Greeks, aided by outside money and sympathizers, among whom was Lord Byron, regained their independence. An independent monarchy was set up in 1832.

Modern History and Government. From 1830 to 1862, Greece was disrupted by civil dissension and political squabbles, but in that year the son of Christian IX of Denmark was called to become the king of the Hellenes, and since that time better conditions have prevailed. In 1862 England ceded the Ionian Islands to Greece; in 1866-8 the Hellenes joined with the Cretans in a war against Turkey, but the rising was crushed. In 1897 another war took place, the Greeks demanding that Crete should be annexed to Greece. While the "Concert of Powers" would not support Greece in these demands without the consent of Turkey, they constituted Crete an autonomous state, under a High Commissioner of the Powers, but still under the suzerainty of the Turks. After 1906 the right of the king of the Hellenes to name the High Commissioner was recognized until May 31, 1913, when the island was ceded to the Balkan Powers, which, in August the same year, formally recognized its union with Greece.

Before the Balkan wars the area of Greece was more than 25,000 square miles, and the population nearly 3,000,000. Greece gained by those wars, together with the island of Crete, 16,919 square miles and a population of more than 2,000,000, bringing the total area to more than 41,000 square miles and the population to nearly 5,000,000.

Greece and the Great War. The War placed Greece in an embarrassing position. Queen Sophia, wife of King Constantine, was a sister of the German Emperor and the royal family favored the Central Powers, while a great majority of the people favored the Allies. Moreover, Greece was pledged by treaty to aid Serbia if that country was invaded, but Constantine broke the treaty when the Bulgarians invaded Serbia in 1916. Meanwhile, a pro-ally party revolted under Venizelos and established a government at Cornea, later removing it to Saloniki. Such pressure was brought to bear upon Constantine by the Allies that he was compelled to abdicate in June, 1917. He was succeeded by his son, Alexander, and Greece entered the War on the side of the Allies. Alexander died in 1920 and Constantine was recalled to the throne by a popular vote, and hastened to resume his former duties.

After the Turkish revolution of 1920, however, the Kemalist forces so far encroached upon Greek territory in Asia Minor that the Greeks launched an offensive against them in 1921, intending to drive them out. The Turkish forces were stronger and better officered than was expected, and the Greeks were put to rout, losing their Asiatic territory and their European territory as far west as the Maritza River. This defeat resulted in a revolution in Greece. The ministers who were responsible for the war were tried and put to death, King Constantine was dethroned and exiled, and Crown Prince George was placed on the throne. An economic crisis was barely averted after the refugees poured into Greece by the thousands.

Statistics. The following are the latest reliable statistics available:

Land Area, square miles	41,933
Water area, acres	219,762
Population (1920)	2,800,164
Chief Cities:	
Athens	300,701
Salonica	170,195
Piraeus	133,482
Patras	52,133
Adrianopolis	50,201
Number of nomes (counties)	37
Members of chamber of deputies	316
National revenue	$255,000,000

Bonded indebtedness	$200,000,000
Farm area, acres	3,216,457
Wheat, bushels	11,170,000
Corn, bushels	7,87[illegible],000
Rye, bushels	3,151,000
Oats, bushels	4,134,000
Tobacco, pounds	68,500,000
Olive oil, gallons	13,801,000
Nuts, pounds	6,376,590
Currants, tons	95,000
Cheese, pounds	14,812,875
Domestic Animals:	
Horses	131,436
Mules	111,979
Asses	242,700
Cattle	527,173
Sheep	5,467,828
Swine	365,074
Manufacturing establishments	2,213
Capital invested	$ 52,072,729
Operatives	36,124
Iron ore, tons	51,500
Magnesite, tons	68,600
Lignite, tons	205,000
Salt, tons	31,600
Emery, tons	10,200
Chromite, tons	8,800
Miles of railway	1,470
Number of public schools	7,224
Pupils enrolled	532,103

Greek Church, a branch of the Christian church. It was originally the church of the Byzantine or eastern empire, having its seat at Constantinople. The Greek language and traditions bear much the same relation to the Greek Church that is sustained by the Latin language in the Roman Catholic church. The theological differences are not serious. Both churches are Trinitarian. Each has seven sacraments. The priests of the Greek Church, however, are required to be married before ordination. If the wife of a priest dies, he is required to resign his charge and go into a cloister. The Greek Church rejects the doctrine of purgatory. It allows no carvings, graven, nor cast images, but permits painted images of Christ, Mary the mother, and the saints. This rule is not observed in Russia, however. The people of Greece, Russia, and the small countries of the lower Danube are members, chiefly, of this church. Among adherents elsewhere are 30,000 in Catholic Italy, one-fourth of the population of Hungary, and many congregations in Turkey and Asia Minor. The members of the Greek Church would not accept the Gregorian or reformed calendar. Wherever found, even in the United States, they follow their ancient ritual and observe the old dates, so that their dates are twelve days behind ours. Instead of kneeling at prayer, they

During the famine in Russia in 1921, the Soviet government requisitioned church property to aid the sufferers. Resistance of the high church officials to this order led to the arrest, trial and execution of some of them. Later, religious instruction was forbidden in all schools. In 1923 there seemed to be a determination on the part of the government to abolish the Church.

Greek Fire, an inflammable substance first used in war by the Greeks of the Eastern Empire in the eighth century. The process of its manufacture was obtained from India and was kept a secret for several centuries. The fire is supposed to have been composed of niter, sulphur, and naphtha. It was thrown by means of tow fastened to an arrow or a dart, or else it was projected through a tube. Wherever it fell, it burned with inconceivable rapidity, and, like gunpowder, could not be extinguished by ordinary means. Chambers suggests that the term *cracker,* as used in *firecracker,* is a Norman corruption of the word *creyke* of the Middle Ages, in turn derived from *grecque,* by which this composition was known in Europe. From all accounts Greek fire must have resembled gunpowder. In 717, when the Saracens were repulsed from a determined attack upon Constantinople, capital of the Greek Empire, the newly invented "Greek fire" was the chief weapon of the defense. The

Greek Language. See LANGUAGE.

Greek Literature. See LITERATURE.

Greeley, Horace. (1811-1872), an American journalist. He was born February 3, 1811, at Amherst, New Hampshire and died November 29, 1872, near New York City. Greeley's father was a farmer. Like other farmer boys Horace took a share in leading the horse to plow, in dropping corn, and in driving the cows. He learned to read before other boys learned to talk, and by the time he was ten years old he had borrowed and read every book in the neighborhood. Horace was a famous speller and was fond of recitations. His only education was tha

of a district school. In 1826 he became an apprentice in a newspaper office in East Poultney, Vermont; thus gratifying an ambition to follow the trade of Benjamin Franklin. After working on various country papers Greeley set out for New York. He arrived in 1831. He had ten dollars in his pocket and owned a small bundle of clothes. After the usual search for employment, which he obtained with difficulty, he worked for wages about one year and one-half. He then went into partnership with Francis Story and commenced to publish the *Penny Post*—the first penny paper published in this country. The enterprise was unsuccessful, but the partnership was continued for a time, ending with Mr. Story's death.

Mr. Greeley was connected with the *New Yorker,* the *Daily Whig,* the *Jeffersonian,* and with the *Log Cabin*—a campaign journal in the interest of Gen. Harrison, the candidate for the presidency. In 1841 the *Log Cabin* and the *New Yorker* were merged in the *Tribune* with which Mr. Greeley's name is identified. The history of the *Tribune* is a chapter in itself. It began as a small penny sheet, without presses, without capital, with but 500 subscribers. Through the energy of a business manager and the ability of Mr. Greeley as an editor, the *Tribune* acquired an enormous circulation and later paid Mr. Greeley an editorial salary of $10,000 a year. Greeley was averse to moneymaking. He was generous, always ready to help those in difficulty, but had no patience with people who approached him with schemes for making money. Although a large stockholder in the *Tribune,* he was opposed to dividends, desiring that all surplus be used in enlarging and improving the paper. He lived for influence, as other men live for wealth. It is doubtful whether any other American editor ever equaled Horace Greeley in his influence on public opinion.

Among other public measures, Greeley favored the homestead system of disposing of public lands. He became much interested in the west. "Go west, young man, go west, and grow up with the country," is attributed to Greeley. He took part in the establishment of the irrigation colony at Greeley, Colorado. The town, in fact, was named for him. Agricultural societies and agricultural addresses were his delight. He was in favor of the protective tariff. He was a Whig in politics and took part in the organization of the new Republican party. Greeley tried to prevent the Civil War, and, for a time, even denied the right of the North to "coerce" the South; but, when war became inevitable, he favored a vigorous prosecution of hostilities. The *Tribune* was no doubt partly responsible for the precipitate attack upon the Confederacy which ended in the disastrous rout of Bull Run. At the close of the war Greeley was the recipient of much abuse because be became one of the bondsmen for Jefferson Davis, president of the Confederacy, who was imprisoned on the charge of treason. The *Tribune* favored universal suffrage and universal amnesty.

Mr. Greeley held few public offices. In 1849 he was a member of the National House of Representatives for a short time. He served as a juror of the World's Fair in Crystal Palace, London, 1851, contributing editorial letters to the *Tribune* during his absence. In 1855 he visited the French Exposition. In 1859, before the day of the Union Pacific, he made an overland journey across the plains to California and was much pleased with the reception given him by the public at Sacramento and San Francisco. Greeley was a staunch supporter of Grant's first administration, but joined the opposition on the score that Grant was in the hands of a circle of corrupt officeholders. He took part in uniting the various anti-administration parties into the Liberal party, and in 1872 accepted its nomination for the presidency. During the canvass Greeley underwent excessive mental and physical labor. The death of his wife at this time and a crushing defeat at the polls are believed to have been the cause of Mr. Greeley's death shortly after the election.

In addition to his labors as a newspaper man, Mr. Greeley wrote several works:

Hints Toward Reformation, 1850.

Glances at Europe, 1851.

History of the Struggle for Slavery Extension, 1856.

Overland Journeys to San Francisco, 1860.

The American Conflict, 1864-7.
Recollections of a Busy Life, 1869.

Horace Greeley is a unique figure in American journalism. Old-fashioned, quick-tempered; always clean, never tidy; his linen always presentable, his necktie always awry; profane, incorruptible; scorning money, yet controlling all that man could want of it; reckless in politics, but unswerving in the support of right men and measures; decisive, able, and fearless; a man of the common people—there has been but one Horace Greeley, and there never can be another. Parton's *Life of Greeley* is the best view of his services.

See FOURIER; CARY.

Greely, Adolphus Washington (1844-), an American Arctic explorer. He was born at Newburyport, Massachusetts. He received a high school education, and at the age of seventeen enlisted as a private in the Civil War. In 1867 he entered the regular army as lieutenant and the following year was appointed to the signal service. The International Geographical Congress held at Hamburg in 1879 recommended the establishment of circumpolar stations, and in 1881 the United States fitted out an exploring expedition for this purpose. Greely was put in charge of this expedition, and made his headquarters for two years at Discovery Harbor, Grinnell Land. From this point detailed expeditions were sent out, one of which reached the latitude of 83° 24′, the farthest north of any point reached up to that date. Greely got his party back to Cape Sabine with great difficulty, and during the terrible hardships of the winter of 1884 so many of his companions died from cold and starvation that only Greely and six others remained when they were rescued in June, 1884, by a relief expedition under Winfield S. Schley. Greely's geographical discoveries during this expedition were of importance. He was awarded medals by the Royal Geographical Society of England and by the Société de Géographie of Paris. In 1887 Greely succeeded General W. B. Hazen as chief of the signal service, receiving the title of brigadier-general. In 1886 General Greely published an account of his expedition under the title of *Three Years of Arctic Service.* Schley has published a book entitled *The Rescue of Greely,* which is a fitting sequel to Greely's own story.

Green, Hetty Howland Robinson (1835-1916), America's greatest female financier and probably in her day, the most able business woman in the world. She was born at New Bedford, Massachusetts, and educated at Mrs. Lowell's School, in Boston. Inheriting a large fortune from her mother in 1865, she immediately showed boldness and shrewdness as an investor, and unbounded ability as a manager. In 1867 she married Edward H. Green. Mrs. Green had business headquarters in New York and Chicago. Her financial interests were world wide, and she personally supervised all her investments.

Green, John Richard (1837-1883), an eminent English historian. He was born at Oxford and was graduated at that university in 1859. He entered the ministry, but failing health and differences of opinion led him to seek a position as a librarian. He drifted through magazine writing into serious historical composition. *A Short History of the English People,* published in 1874, attained instant success. "What Macaulay had done for a period of English history, Green did for it as a whole," said one critic. A more extended work, *The History of the English People,* followed. It is one of the standard histories of England. As compared with other historians, Green paid less attention to wars, rulers, and parliaments, and more attention to the development of the arts and sciences and the comforts of common life. The nature of his work is well expressed by the titles he chose. Later he planned an extended critical work of many volumes. Two of these, the *Making of England* and the *Conquest of England,* he completed before his death.

Green, one of the seven colors of the spectrum. A yellow light can be resolved into a red and a green or may be produced by blending a red light and a yellow; but a green light cannot be produced by blending other lights, nor can it be resolved into two lights. It is called, therefore, one of the primary colors of the spectrum. A green pigment—coloring material—may be produced usually by mixing a yellow and

a blue pigment; but it is an error to say that green is a mixture of these—blue and yellow. Green, then, occupies a central position in the spectrum. As compared with other colors, the waves are of average length. For this reason, no doubt, green is the easiest color on the eye. Fortunately, it is the color of nature. The green of foliage is due to the action of light on the chlorophyll in the leaf cells. In art, green forms a grateful background, the best for a mixture of colors. See COLOR.

Greenaway, Kate (1846 - 1901), an English painter and illustrator whose drawings of and for children are internationally known, was born in London and studied art there. She first exhibited in 1868 a water color drawing called *Kilmeny*. She continued to exhibit, and her fresh and original work soon became popular. Skilful coloring and a delightful humor characterize her drawings, which were praised by John Ruskin. Miss Greenaway's earliest work appeared in *Little Folks*. Other books are *Under the Window, Mother Goose, A Birthday Book for Children, A Day in a Child's Life.*

Greenback Party. See GREENBACKS; POLITICAL PARTIES.

Greenbacks, paper money, promises to pay issued by the United States government during the Civil War. The notes were so called from the color of the ink with which their backs were printed. Through political agitation the term is identified more or less closely with paper money in general. The national Constitution denies the states authority to emit bills. It does not expressly authorize Congress to issue notes, but Congress has assumed authority on several occasions.

During the war of 1812 treasury notes to the amount of $36,680,794 were issued. They were chiefly $100 notes bearing 5 2/5 per cent interest, receivable for taxes or dues to the government and legal tender in discharge of all private debts. The latest of these issues consisted of small bills bearing no interest. During the financial panic of 1837, and closing with 1844, various acts were passed, under which notes to the amount of $47,002,900 were issued. They were for the most part bills for $50 or $100, running for one year and bearing interest at a rate varying from six per cent downward to practically nothing, one thousandth of one per cent.

Again during the Mexican War, the government felt obliged to resort to paper money. Notes to the value of about $90,000,000 were issued in large denominations, bearing from three to six per cent interest. During the Civil War the government had to put forth every effort to obtain the means of paying costs that rose to the enormous figure of $30,000,000 per day. August 31, 1865, the amount of paper money afloat, including notes, greenbacks, and fractional currency, was $1,732,725,414.67. The notes bore interest ranging as high as 7 3/10 per cent, and were in large denominations. The greenbacks, like currency of the present day, were issued in various denominations and bore no interest. January 3, 1864, the circulation of greenbacks amounted to $449,338,902. Fear lest the war might prove a failure or that the government could not redeem so large an amount of paper reduced its value. At one time, when the Confederate general Early was near the gates of Washington, it required $285 in greenbacks to buy $100 in gold. As specie had retired from circulation fractional currency was issued. These "shinplasters," as they were derisively called, were in denominations of three, five, ten, twenty-five, and fifty cents, corresponding in value to the coins they replaced. In 1865 fractional currency to the amount of $26,344,742.51 was outstanding. Many bills and notes were burned, lost, or kept as souvenirs and never presented for payment. This proved especially true of fractional currency; but, to the credit of a democratic form of government, it may be said that the United States has paid every dollar of its war obligations without loss to the holder.

Two kinds of paper money are now in circulation. In exchange for United States bonds deposited with the United States treasury for security, the government authorizes national banks to issue paper money and guarantees its value. The gov-

ernment issues also a limited amount of paper money. The government notes now in circulation are gold certificates, authorized March 3, 1863; silver certificates, authorized by the Bland Act of February 28, 1878; treasury notes, authorized by the Sherman Act of July 14, 1890; and United States notes or "greenbacks" of 1862 and 1863. See MONEY; COUNTERFEITING.

Green Bay, a city in Wisconsin, located on Green Bay at the mouth of the Fox River. It is at the terminus of the ship canal between Lake Michigan and the Mississippi; the canal here uses the Fox River. The principal lake port of northeastern Wisconsin, it has freight and passenger connections with all other large ports on the Great Lakes, for its harbor accommodates the largest of the lake steamers. It is also a great railroad center, distributing coal, lumber, fish and other commodities to a wide market. The city has a number of public buildings, and several charitable institutions. It is the oldest town in the state, having been founded early in the seventeenth century. In 1895 Fort Howard was united with Green Bay. Population, in 1920, 31,017.

Greene, Nathaniel (1742-1786), an American general of the Revolutionary War. He was a native of Mulberry Grove, Georgia. The Greenes were Quakers. Nathaniel was brought up to work on his father's farm, in his father's mill, and at his father's forge; yet managed to acquire much more than a common school education. In 1774 he joined the militia and was expelled from the Quaker congregation. The next year he married a Rhode Island wife and led the Rhode Island troops to the relief of Boston. His soldiers were noted for their excellent discipline. His sturdy character and ability won Washington's confidence. He was made a brigadier-general and was with Washington in the engagements at Harlem Heights, Trenton, Princeton, Brandywine, and Germantown. When Washington was absent from the army he left Greene in command. In the spring of 1780 Greene was president of the court that inquired into General Arnold's conduct as commander of Philadelphia.

In October Greene was sent south to oppose Cornwallis. Gates, it may be remembered, had been outgeneraled, and his forces cut to pieces at the battle of Camden. Greene, who was familiar with the people of the South, enlisted the hardy riflemen of that region. They were clad in buckskin suits and wore coonskin caps. They carried muzzle-loading flint-lock rifles and drove home their bullets with hickory ramrods. Ammunition was precious. They were expert marksmen and invaluable soldiers. Greene divided his forces. A part under Morgan defeated Tarleton at Cowpens; then reuniting the wings of his army, Greene executed a masterly retreat of 200 miles across the Catawba, the Dan, and the Yadkin. At each crossing, he impeded tardy pursuit by gathering up the boats far and near. At Guilford courthouse Greene made a stand and lost a battle; but Cornwallis thought it advisable to retire to the coast at Wilmington. Here Greene left him to rest and marched southward. The British abandoned post after post, until their forces were cooped up in Savannah and Charleston. As the result of Greene's brilliant campaign, the British were driven almost out of the South. At the close of the war Congress ordered a medal struck in commemoration of his services. The Carolinas and Georgia made him valuable grants. He retired to a plantation on the Savannah River, where he died from the effect of a sunstroke.

As a soldier he was energetic, alert, persistent, and full of resource. His soldierly qualities were not unlike those of U. S. Grant.

Greene, Mrs. Sarah Pratt McLean (1856-), an American novelist. She is a native of Connecticut. Her first novel, *Cape Cod Folks,* brought her a reputation as a storyteller. It brought to her publishers considerable trouble in the way of lawsuits caused by the author's use of names of living people for her characters. Her other writings include *Deacon Lysander, Tow Head, the Story of a Girl, Lastchance Junction,* and *Vesty of the Basins.*

Greenfield, Mass., a manufacturing city, the county seat of Franklin County, is on the Deerfield River near its junc-

tion with the Connecticut, 56 miles west of Fitchburg and about 20 miles south of the Vermont state line. It is served by the Boston and Maine Railroad. The industrial establishments of Greenfield produce cutlery, bricks, cement building blocks, machinery, machinists' tools, taps and dies, agricultural implements, silverware, jewelry, wooden ware and paper boxes. There is an extensive park system in the city, and the surrounding country abounds in places of scenic interest. The public schools and library are modern, and the city contains two hospitals and a Federal building. Population 1920, 15,642.

Greengage. See PLUM.

Greenhouse, a glass house in which plants are grown. The greenhouse has developed from the European notion of training grapevines, fruit trees, and other plants on the sunny side of stone walls, and later, of protecting them by a glass sash. From the covered wall to the lean-to greenhouse is but a short step. Then came the low, extended greenhouses of the florist, the fruit and the vegetable grower. The conservatory, on the other hand, we have developed from a sunny window.

Modern greenhouses are built, both sides and walls, of sash filled with glass. The typical structure is low, but covers a large area. Greenhouses are heated usually by steam or hot water; the latter in pipes or open tanks. Hot air flues are still in use. American commercial greenhouses date from the beginning of the nineteenth century, but were not numerous before the Civil War. At the begining of the twentieth century, according to the official census report, the florists of the United States alone had 68,030,666 square feet of glass surface, not to mention acres of glass under which the young plants are started, or cucumbers, lettuce, tomatoes, pineapples, radishes, onions, asparagus, and other fruits and vegetables are raised for the early market.

Greenland, a large island lying between North America and Europe, almost wholly within the Arctic Circle. Its greatest breadth, east and west, is 690 miles. Its length in a north and south direction is as yet unknown. Its area certainly exceeds half a million square miles. Greenland is an unusually mountainous country. The peaks on the western coast are from 5,000 to 6,000 feet high, while those on the eastern side run still higher, the greatest known elevation being Petermann Peak, estimated at 11,000 feet, nearly twice the height of Mt. Washington. The interior of Greenland is a rounded mass of glacial snow and ice, beneath which it is impossible to say what exists. The ice-cap rises high enough to conceal lofty mountains. The Antarctic ice-cap is considered the largest mass of ice in the world. That of Greenland ranks second. There is ice enough in Greenland to cover the entire United States one-fourth of a mile deep. Around the coast, bare strips escape from the ice. The widest extends along the western coast, and is from sixty to one hundred miles broad. The coast shows everywhere signs of subsidence. It is worn by glaciers into inlets comparable to those of the Alaskan coast. In fact, the fiords of Greenland surpass even those of Norway in magnitude. One of the largest is 160 miles long. Many are still filled with glaciers whose ends are 1,000 or even 2,000 feet thick. The Upernavik glacier creeps seaward in summer at a rate of ninety-nine feet per day, the highest rate of glacial advance known. In addition to the enormous discharge of ice into the sea, still greater quantities of water find their way under and through the ice in subglacial rivers.

The island belongs to Denmark. A few hundred Danes live in the several villages and administer affairs. Upernavik is the most northerly inhabited village in the world. About 10,000 Eskimos hunt, trap, and fish, Indian fashion, and trade with the Danes. The Eskimos are expert in the use of snowshoes, dog sleds, and canoes. They live in tents in summer and in stone huts in winter, or, failing the latter, they are skillful in the construction of snow huts of a beehive or dome shape. Settlements are confined to the valleys on the coast.

The western coast is warmer than the eastern, as a warm ocean current runs up the western side while a cold Arctic current follows the eastern shore southward. The interior of Greenland is one of the

coldest spots known, twenty degrees colder than the Arctic Ocean.

See GLACIER; ICELAND; PEARY.

Greenockite. See CADMIUM.

Green River, a large and important tributary of the Ohio River, rises in Lincoln County, near the center of the state of Kentucky, flows west-northwestward about 300 miles, and empties into the Ohio eight miles above Evansville, Indiana. By means of dams and locks the river has been made navigable for about 200 miles of its length.

Greensboro, N. C., the county seat of Guilford County, is situated 81 miles northwest of Raleigh, on the Southern Railroad. Besides manufacturing spokes, handles, bobbins, flannel, stoves, furniture, sewer pipes, cigars, bricks, and tiles, Greensboro carries on a considerable trade in coal, iron, cotton and tobacco. Near here was fought the battle of Guilford Court House, on March 15th, 1781. The city is named for the commander of the continental army, General Greene. It is the seat of the Greensboro Female College, the State Normal and Industrial College for white women, and the State Agricultural and Mechanical College, Bennett College, and Lutheran College (for Negroes). There are two fine parks and a public library. The population was 19,861 in 1920.

Greensburg, Pa., the county seat of Westmoreland County, is situated in a coal and gas field, 31 miles east by south of Pittsburgh. It is served by the Pennsylvania Railroad. It has an extensive trade in the coal that is mined in the vicinity and manufactures nuts and bolts, brass ware, iron, glass, flour and bricks. The village of Hanna's Town, destroyed by the Indians in 1782, stood near the site of Greensburg, and is said to have been the seat of the first regularly constituted court of justice west of the Alleghany Mountains. Besides the public schools, St. Joseph's Academy for young women is located here. Population, in 1920, 15,033.

Greenville, Miss., the county seat of Washington County, is situated on the Mississippi River, and on two railroads 138 miles south of Memphis, Tenn. The land in the immediate vicinity of this city is known as the Yazoo Delta; this delta is richly productive of cotton. The trade and industrial life of the city is connected with cotton; there are cotton-seed oil mills, cotton compresses and planing mills. River steamers connect it with other river cities. It has a public library, public parks and play grounds and modern schools. Population in 1920, 11,560.

Greenville, S. C., the county seat of Greenville County, is an important manufacturing city, 160 miles northeast of Atlanta, Ga. The chief industry of the city is the making of textiles. Bagging, underwear and cotton goods are manufactured, and there is a large bleachery. There are also foundries and wagon works. Greenville is also of some importance as an educational center; here are located Furman University, for men, Greenville Female College, Ursuline Academy and Chicora College. It has a library and modern public graded schools. The population in 1920 was 23,127.

Greenville, Tex., the county seat of Hunt County, is 54 miles northeast of Dallas, on three railroads. It is in a cotton growing and stock raising region and its trade and industrial life are dependent upon these commodities. There are cotton-seed oil mills, cotton compresses, flour mills and stock yards. The city is the seat of Holiness University, Burleson College and Wesley College. The water works and electric light plant are municipally owned and operated. Poulation in 1920, 12,384.

Greenway, Thomas (1838-1909), a Canadian statesman who was premier of Manitoba during 1888-1900. Born in Cornwall, England, he early emigrated to Upper Canada, where he became a merchant. Mr. Greenway served in the Dominion House of Commons from 1875 to 1878, and later removed to Manitoba. Becoming the leader of the Liberal Opposition in 1887, he obtained the premiership the next year. In 1890 the premier succeeded in abolishing the separate or parochial schools, and his administration saw the enactment of valuable measures to promote public economy and railroad building. The law with reference to the parochial

schools and the law passed during Mr. Greenway's administration abolishing French as the official language of the province excited bitter criticism and opposition, and became a Dominion political issue.

Greenwich, grēn′ĭj, a village on the the old royal palace. Greenwich Park, laid out during the reign of Charles II, occupies 174 acres. It is clothed with fine old chestnuts in which a herd of tame deer may be seen. It is a favorite place of resort for Londoners. A hill in the center, 180 feet in height, is crowned with the famous Greenwich Royal Observatory, from the meridian of which English astronomers Greenwich is, in fact, accepted by geogra- make their calculations. The meridian of phers of all countries as the prime or first meridian. The correct time for England is indicated here every day at 1:00 P. M. by the descent of a large colored ball. The time is telegraphed to the most important cities throughout the United Kingdom.

Greenwood, Grace. See LIPPINCOTT, SARA JANE CLARKE.

Gregg, William (1817-1902), a Canadian Presbyterian clergyman and educator, was born in Donegal, Ireland, of Scotch parents. He was educated at the universities of Glasgow and Edinburgh. He left Scotland in 1846 to go to Canada as a missionary, and in 1847 was ordained a minister in the Free Presbyterian church in Canada. After holding several pastorates in Ontario he became a lecturer in Knox College, and was professor of apologetics from 1892 to 1895. He was moderator of the Free Presbyterian church in Canada in 1861. He wrote several books on religion and church history, among them being: *A Book of Prayer for Family Worship* and *A History of the Presbyterian Church in the Dominion of Canada.*

Grégoire, Henri (1750-1831), a Frenchman of the Revolution, and Bishop of Blois, was born near Lunéville. He was educated by the Jesuits and took orders. He became an ardent reformer and was an advocate of negro emancipation, and interested himself to such an extent that this oppressed race was freed by decree on Feb. 4, 1794, this applying to all the French possessions. He was broad and liberal in his views, evidenced by advocating full civil rights to the Jews that resided in France. In 1801 he became a member of the Senate and opposed the proclamation of the Empire.

Gregory I, pope, 590-604. He introduced into cathedral music the melodies known as the Gregorian Chant. He also reformed the ritual, giving it the shape known as the Gregorian Liturgy, according to which mass is still celebrated. He was zealous in the conversion of heretics and in the advancement of the various orders of monks. He did much to establish the rule forbidding priests to marry.

Gregory VII, pope, 1073-1085. He is known in history as Gregory the Great. His private name was Hildebrand. He was a native of Tuscany. While still a cardinal he was the power behind the papacy. He established the present method of selecting popes by a college of cardinals, excluding the people and the clergy of Rome from any voice in the election. As a pope he was active in reform. The struggle began between himself and the emperor, Henry IV, over "investiture," the appointment of bishops. Gregory claimed the right of appointing them because they were church officers; Henry claimed it because they were vassals of the emperor. Neither side would yield, but after a prolonged struggle, Henry in order to save his crown, was obliged to seek the pope at Canossa, and do penance before him. Gregory had no alternative but to grant forgiveness and restore Henry to power. Soon after this Henry again turned against Gregory, and drove him into exile at Salerno, where he soon after died. His last words were, "I have loved righteousness, and hated iniquity; therefore I die in exile."

Gregory XIII, pope, 1572-1585. He was a native of Bologna. Among his public acts was a zealous patronage of the Jesuits, a vigorous opposition to the Huguenots of France, and the support of Philip II of Spain in sending the Great Armada against England. The computation of time was reformed during his term of office. We still follow the Gregorian calendar.

Grenfell, Wilfred Thomason (1865-), a heroic medical missionary to the fishermen of the Labrador coast. He was born at Liverpool; his liberal education was received at Oxford and at the London Hospital. In 1889 he began mission work among the fishermen of the North Sea; he fitted out the first hospital ship, and cruised with the fishermen from the Bay of Biscay to Iceland. His better known work along the Labrador coast, like his first undertaking, is under the Royal National Mission to Deep Sea Fishermen, an English organization. Dr. Grenfell is superintendent of the work in Newfoundland and Labrador. The little hospital steamer bearing Dr. Grenfell cruises up and down the bleak and very dangerous Labrador coast, setting the doctor ashore at the scattered, poverty-stricken homes of the fishermen, scarce one of which is without its ailing patient. Since the beginning of his work, three modern hospitals have been built along the coast, each with a competent physician at the head. New life and light have been brought to the brave people by this man who fights sin as valiantly as he does disease. Dr. Grenfell's books are *Adrift on an Ice Pan, A Man's Faith, The Harvest of the Sea, Off the Rocks,* and *Labrador.*

Grenville, George (1712-1770), a member of the English Parliament. He held various cabinet positions. He is remembered in the United States as the author of the scheme for stamp duties which went into effect in 1765. He was regarded as a narrow, honest, obstinate man, unable to foresee the result of taxing the colonists without their consent. See STAMP ACT.

Grenville, Sir Richard (1541-1591), an English naval commander. He was engaged in various naval expeditions. In 1585 he landed the colonists at Roanoke Island. He is remembered chiefly as the hero of an engagement with the Spanish in 1591. With his flagship only he attempted to cut his way through a Spanish fleet of fifty-three ships. While he lay becalmed his ship was attacked by fifteen of the largest Spanish vessels. After fifteen hours of battle with but twenty men out of one hundred and fifty left alive to man his ship, he was forced to surrender. He was wounded mortally and died soon after the engagement. Tennyson has made the incident the subject of a stirring ballad entitled *The Revenge.*

Gresham, Sir Thomas (1519-1579), a London merchant. He was the founder of the Royal Exchange and of Gresham College, London. His father was a merchant, prominent in the reign of Henry VIII both as lord mayor of London and as a financier. Gresham succeeded his father both as a merchant and a banker. In the reign of Queen Elizabeth he rendered the government signal service. He is mentioned chiefly, however, as the author of Gresham's Law. Briefly stated, it is this: "Cheap money drives good money out of circulation." One naturally pays out a mutilated coin and keeps a good one. Then, too, when gold and silver coins are in circulation, if either dollar becomes worth more than the other, the dollar of greater value is hoarded and goes out of circulation. The point is that if cheap money will buy as much and pay debts as far as more expensive money, people will pay out cheap money and keep dear money. Even if the people are not shrewd enough always to do so, the banks garner the better money with industry into their vaults. During our Civil War, when paper money was worth less than gold, the latter was seldom to be seen, except in the vault of a bank, or in private hands where it was hoarded as a curiosity. Everyone paid his obligations in paper money because it was cheaper to do so.

Gretna Green, a Scottish village on Solway Firth, eight miles from Carlisle. According to old Scottish law, a couple might be regularly married by declaring themselves man and wife in the presence of witnesses. If, for instance, a couple presented themselves before a hotelkeeper as man and wife, they were recognized as such by the laws of Scotland as firmly as though the banns had been proclaimed and they had been united by a priest in cassock and bands. The ease with which such a marriage might be arranged made Gretna, the first town on the Scottish side of the

border, a favorite resort for runaway couples from England. Many a thrilling ride is related. Unless pursuing friends were able to overtake the flying pair before they reached Gretna Green, it was too late to interfere. These marriages came to an end through the enactment of a statute that marriages contracted in this irregular way should be null and void, unless at least one of the parties had resided in Scotland not less than twenty-one days. James Barrie has written an entertaining sketch entitled *Gretna Green Revisited*.

Grey, Albert Henry George, Earl (1851-). an English statesman, governor-general of Canada. He was educated at Harrow and at Trinity College, Cambridge. From 1880 to 1886 he was a member of Parliament of the Liberal party. He was a friend of Cecil Rhodes, and became administrator of Rhodesia in 1896. Two years later he was made a director of the British South Africa Company, later becoming vice-president. Appointed governor-general of Canada in 1904 he served in that capacity till September, 1911, when he was succeeded by the Duke of Connaught. His administration was one of great good feeling.

Grey, Lady Jane (1537-1554), "the nine days' queen" of England. She was born in Leicestershire, the granddaughter of Henry VII's younger daughter Mary. The Duke of Northumberland, then Lord Protector to King Edward VI, was ambitious to have the crown in his own family, so he compelled Lady Jane to marry his son, Guilford Dudley. Then he persuaded Edward to change the line of succession and leave the crown to Lady Jane, passing by the king's sisters, Mary and Elizabeth. Edward died July 6, 1553. On the 9th Jane was taken before the Council to be acknowledged queen. But Mary Tudor, Edward's sister and rightful heir to the throne came to claim her own, and was declared sovereign by the lord mayor of London, July 19, 1553. Mary was reluctant to have the innocent Jane killed, but yielded to her ministers, and on February 12, 1554, Jane and her husband were beheaded. She has been called "the hapless instrument of the Dudleys' ambition." Surely there is no sadder figure in history. A quiet, studious girl, she was nagged at by her parents until the only joy she had in life was studying with her beloved tutor, John Aylmer. Though she was only seventeen when she died. she had corresponded several years before with the scholar, Roger Ascham, in both Latin and Greek.

The following words of Ascham give an insight into the little maid's character; he had found her reading Plato:

> And how came you, Madam, quoth I, to this deep knowledge of pleasure? . . I will tell you, quoth she, and tell you a truth which perchance you may marvel at. One of the greatest benefits God ever gave me is that he sent me so sharp and severe parents and so gentle a schoolmaster. For when I am in the presence of either father or mother, whether I speak keep silence, sit, stand, or go, eat. drink, be merry or sad, be sewing, playing, dancing, or doing anythir , else, I must do so, as it were, in such weight, number, measure, even so perfectly as God made the world, or else I am so sharply taunted. so roughly threatened, yea, ... sometimes with pinches, nips and bobs, that I think myself in hell till time come that I must go to Mr. Elmer (Aylmer), who teacheth me so gently, so pleasantly, . . . that I think all the time of nothing while I am with him. And when I am called from him, I fall on weeping, because whatsoever I do else beside learning is full of grief, trouble, fear, and whole misliking unto me.

Grieg, grēg, **Edvard Hagerup** (1843-1907), a noted Norwegian composer and pianist. Bergen is his birthplace; his studies were pursued at Leipsic and then at Copenhagen. As a pianist he made a name for himself in England, Germany, and Italy, but he is best as a composer. His compositions are of many different kinds, —folk songs, chamber music, heavy suites for orchestra, works for piano with orchestra, and others. Ibsen, the dramatist, and Björnson, the author, were his friends. *Peer Gynt,* perhaps his best-known work, is the orchestral music for Ibsen's play of that name. Probably the characteristic which most endears his music to so many is its great originality, for Grieg's music is not like any other music. His themes are not smooth and tranquil, but are very erratic, being brilliant and moody by turns. They are thought to reflect the temperament of his northern countrymen.

Griffin, or Gryphon, in Grecian legend, a fabulous creature with the body and legs of a lion and the head and wings of an eagle. Griffins were supposed to be natives of India, where, it was said, they guarded hidden treasure, and built their nests of gold and watched them vigilantly to keep them from plunderers. They were believed by the Greeks to flourish in the Rhipaean mountains, between the Hyperboreans and the one-eyed Arimaspians of Scythia. They guarded the gold of the north. The figure of the griffin was used frequently as an ornament in works of art. It signifies a union of the lion's strength with the swiftness and agility of the eagle. It is an emblem of watchfulness and courage.

Grimm, Jacob and **Wilhelm,** German philologists, writers, and university professors. Jacob, the older, lived 1785-1863. Wilhelm lived 1786-1859. Throughout their lives they were inseparable, and are spoken of as the Brothers Grimm. Wilhelm was married. Jacob remained single and lived with his brother. With five other professors they were expelled from the faculty of the university of Göttingen in 1837 for teaching that the elector of Hanover was exceeding his constitutional authority. The brothers united in making a popular collection of fairy tales known as *Kinder und Haus Märchen.* Wilhelm was a cheery, social man; Jacob was a renowned student of the German language. He left a German grammar and a German dictionary incomplete. The rule relative to consonant changes, known as Grimm's Law, was published by him. According to this law, the *t* of the Latin becomes *th* in Low German, including English, and *d* in high German. In support of this statement we find that the singular pronoun of the second person is *tu, thou,* and *du* in Latin, English, and German respectively. *P* undergoes similar changes. The *pater* of Latin becomes *father* in English and *vater* in German. According to Grimm's Law, which covers other letters as well, one would know from a Latin word what form to expect in English and in German; and conversely, from an English or German word what to expect in the other two languages. The cause for the changes in the consonantal sounds as the word traveled from Italy northward is not understood. It may be due to change in climate, causing people to keep their mouths closed, or to some other reason of that sort.

Grindstone, a well known instrument for sharpening tools. In use, a hone is laid on a bench and the tool is moved to and fro on its surface; the whetstone is held in the hand and drawn along the edge of the tool; the grindstone is larger and is mounted on an axle. It consists usually of a piece of fine sandstone shaped like a section cut from the end of a cylinder. The axle passing through the center rests on smooth wheels or well oiled bearings. It may be turned by hand or by a treadle, or caused to rotate by a belt. The grinder holds his tool against the rotating surface. Water is applied usually to the grinding surface, not only to carry away the loosened parts of the steel and the stone, but to prevent heating and gumming. A grindstone may be a few inches or it may be several feet in diameter. The larger the stone, the slower must be the rate of rotation. Owing to centrifugal force, a large grindstone will fly into pieces if turned too fast. Workmen in machine shops are killed not infrequently by such an accident. Artificial grindstones are made of powdered emery and cement. Such a stone is less liable to break under rapid motion. It is called more frequently an emery wheel. Suitable material for grindstones is found in England, Germany, Nova Scotia, Canada, and at Berea, Ohio. Valuable quarries have been opened in Colorado. Machinery is employed in shaping the stones into the cheese form required. See EMERY.

Griselda, grĭ-zĕl′dä, **Griseldis,** or **Grissel,** in medieval legend, a character who was so patient under severe tests imposed upon her by her husband that her name has become proverbial. Griselda was the beautiful daughter of a poor charcoal burner. The Marquis of Saluzzo made her his wife. He treated her most cruelly, but with the presumably justifiable intention of testing her obedience and patience. He took her children from her, pretending that they were put to death, while really they were sent to be brought up elsewhere. Finally, after she had borne

uncomplainingly every indignity and unkindness, her husband informed her that he intended to divorce her and marry another. Even at this the patient Griselda offered no complaint. She was stripped of her fine clothes and sent back to her father's cottage. When the day set for the Marquis' wedding arrived, Griselda was sent for to prepare for and welcome the bride. She made preparations for her rival carefully, and with the same calm sweetness with which she had borne other trials. When the expected "bride" appeared, she proved to be no bride, but Griselda's own daughter, now a beautiful young girl. Griselda was restored to her rightful place as wife of the Marquis and was famous forever after for her patience and wifely obedience. The origin of the story is unknown. Boccaccio told it in the *Decameron*. It is the last story of the collection, and the best. Petrarch translated the story into Latin; Chaucer used it as the clerk's tale in *Canterbury Tales*. Maria Edgeworth has written a novel entitled *The Modern Griselda*. In Shakespeare's *Taming of the Shrew*, Petruchio says of Katharina, "For patience, she will prove a second Grissel."

Groat, the name of an old English coin. The term literally means great, and was applied originally to large copper coins worth more than a penny. In the reign of Edward III a silver groat of the value of eight cents was coined. Three groats made a shilling. It has not been coined since 1856. Like our cent, the term has passed into proverbial use to denote a small sum or little value. It appears in "Not worth a groat," "I care not a groat," etc. The term groats, applied to hulled oats or meal used for food, is of very different origin, being allied to *grit*. See Coin.

Grosbeak, grōs′bēk, a name applied to a number of birds belonging to the sparrow family. They are characterized by stout, that is to say, *gros* beaks. The evening grosbeak is a yellowish bird with a black crown, belly, tail, and wing, the coverts of the latter being white. Its mate is of a brownish gray. It ranges from Manitoba northward, coming south into the United States in winter, but it seldom rambles south of Minnesota. The pine grosbeak, of a slaty gray washed with rose color, ranges with its slaty gray mate from Maine to Alaska. It nests in the pines before snow and ice have disappeared. In midwinter it comes south for a supply of sumac and mountain-ash berries. The rose-breasted grosbeak has a rose-red breast and black upper parts. His mate is dressed in brown, buff, and orange. This grosbeak nests from North Carolina and Kansas northward. It is especially welcome in gardens and orchards on account of its insect-eating proclivity. It is one of the few birds that devour the Colorado potato beetle. See Bird.

Grosgrain, grō′grān, a close woven, fine ribbed dress silk, dyed in plain colors, and having little luster. Grosgrain is highly prized for its wearing qualities. It has held its place among staple dress silks for many years. Ribbon woven with a ribbed effect similar to that of grosgrain silk is called grosgrain ribbon. *Faille* or *Faille Francaise* resembles grosgrain, but the rib is heavier and the fabric soft-finished. Ottoman silk has a still heavier and more noticeable rib.

Grote, grōt, **George** (1794-1871), an eminent historian. The Grotes were a Low German family. The name signifies "great." Grote's grandfather was a merchant of Bremen, who removed to London and engaged in the banking business. George was educated for a place in his father's bank which he entered at the age of sixteen. While a student at the Charter House School he acquired a taste for the classics. He made it a habit to read Greek literature every evening after the close of business. He made the acquaintance of Ricardo and of James Mill, the father of John Stuart Mill. He was fond of music. He married a lady of excellent family, a great beauty, a woman of unusual intellectuality. With the Mills, Ricardo, and others, Grote was accustomed to meet in a sort of literary group. He became much interested in social reforms. His familiarity with Greek literature led him to state repeatedly that Greek history had not been written aright, and that it was not as instructive as it ought to be. Mrs. Grote proposed that he rewrite the subject, a proposition with which he fell in eagerly.

He began reading systematically, jotting down thoughts as they came to him. When his father died George became the head of the family with a private fortune of $200,000 in addition to family estates. He left the bank and entered Parliament, where he became interested at once in a movement for the ballot at parliamentary elections. In 1846, having retired from public life, he took up anew his project for a history of Greece. He drew forth his notes from their pigeon holes, reread his authorities, and, in ten consecutive years, wrote the twelve volumes of his *History of Greece.* It is considered one of the great compositions of the world in this department of learning.

Grote wrote a number of other works, as well as many articles for the reviews. Believing that instruction in Oxford and Cambridge was narrow and too much influenced by tradition, Grote took a prominent part in the founding of the University of London, an institution to which he left a library and a sum of $30,000 to endow a professorship. As might be expected, he opposed to the very last the omission of Greek from the list of subjects required for graduation from college. The universities of Oxford and Cambridge conferred honorary degrees on him. In 1869 Mr. Gladstone offered him a peerage, that is to say, a seat in the House of Lords, an honor which he declined. His remains rest in Westminster Abbey, near the grave of Macaulay.

See BALLOT.

Grotius, grō′shĭ-ŭs, **Hugo** (1583-1645), a Dutch statesman, theologian, historian, and jurist. He was born at Delft, and was one of the most, if not the most learned man of his time. His real name was Hugo de Groot, but according to the fashion of the day it was Latinized. At the age of twenty he was chosen to write the annals of the Low Countries. He was educated for the law at the University of Leyden. He held various important public positions. He was at one time a minister to England, yet was banished for ten years from his native land. In theological matters Grotius was a Protestant, but he tried to reconcile the extreme views of the Protestant and Catholic. He succeeded in pleasing neither party. His friends thought he had a leaning toward popery. The church, of course, classed him with other heretics. Among his writings were a *Commentary on the New Testament* and several compilations of law. He is considered the father of the subject of international law now studied in college. He wrote in favor of settling international disputes by arbitration. He is credited with having set in motion the ideas that culminated 300 years later in the Hague Tribunal.

The American delegates at the Hague Peace Conference placed a beautiful wreath of silver and gold on the tomb of Grotius at Delft. The wreath, which is a large one, is made up, on one side, of a branch of laurel with leaves of frosted silver and berries of gold. The other side is a branch of oak with silver leaves and gold acorns. The knot is tied with a gilded silver ribbon, bearing the arms of the Netherlands and the United States on enameled shields and the following inscription:

To the Memory of HUGO GROTIUS;
In Reverence and Gratitude,
From the United States of America;
On the Occasion of the International Peace Conference of The Hague.
July 4th, 1899.

See HAGUE; LITERATURE, DUTCH.

Ground Cherry, a well known relative of the tomato, potato, and red pepper. There are over thirty species. Wild ground cherries are found throughout eastern North America. They have a tomato-like foliage and flower, but the fruiting calyx enlarges into a papery bladder entirely surrounding the berry. Ground cherries are chiefly used for preserves. Husk tomato, strawberry tomato, bladder cherry, Chinese lantern plant, cape gooseberry, and winter cherries are some of the names applied to the curious fruit of this plant. See TOMATO; CAYENNE PEPPER.

Groundhog. See WOODCHUCK.

Ground Ivy, a creeping plant related to the catnip. It has petioled, kidney-shaped leaves. The bright blue flowers grow in threes in the axils of the leaves. In America it grows in damp and shady places, having been introduced from Europe. It is also known as gill-over-the-ground. In

England it is called also the haymaiden. Its leaves were used for flavoring ale, in which service it preceded hops.

Ground Pine, or **Clubmoss,** a mossy, trailing evergreen plant of deep woods. It is allied to the ferns. There are 100 different kinds. The dusty spores are sold as lycopodium powder by druggists. It kills cockroaches and many other insects. It is almost as inflammable as gunpowder. Ground pine is in demand for Christmas decorations. It keeps well, and is usually gathered during the long Indian summer of the North from Minnesota to Maine, and shipped to market in barrels or boxes. Wisconsin, it is said, ships thirty-five carloads a year.

Grouse, a family of scratching, seed-eating game birds. The family includes the quail, partridge, ptarmigan, prairie hen, spruce hen, etc., as well as the capercailzie, moorfowl, and blackcock of the Old World. The characteristic species of the Mississippi Valley and Manitoba is the pinnated grouse or prairie hen. It is eighteen inches in length. The sides of the neck are decorated with tufts of ten narrow, stiff, marked, black feathers with rounded ends. The skin beneath the tufts is bare. The prairie hen shifts for shelter and food, but is not a bird of passage. It is preëminently a hardy bird of the prairies, and, while not averse to the shelter of a tree top in winter, takes to a soft snowbank with entire comfort. Its legs and toes are heavily feathered.

In spring the male birds assemble on bare, drumming grounds at early dawn and march about with a pompous strut, uttering a drum-like *um-boom-oom* that may be heard for miles of a clear, frosty morning. The females sit quietly by in apparent indifference. The nest is made of old grass on the ground, preferably in a clump of old weeds or willows. It shelters from ten to fourteen buffy olive, sometimes brown-specked eggs. The young are fed with grasshoppers and other insects. When run upon with her young, the mother bird feigns a broken wing and leads an unsuspecting urchin a vain chase. When she has tolled him far enough, in the attempt to catch her, the broken wing mends, and she sails away to the lad's undisguised astonishment. In autumn the entire covey enters the grain fields. The "prairie chicken" shares honors with the mallard in the esteem of sportsmen in the western wheat-raising states and provinces. This game bird suffers more from the destruction of nesting places than from dogs and guns, but, on the whole, the prairie hen bids fair to adapt itself to civilization.

The sharp-tailed grouse keeps more to the north and west. It seeks shelter and wooded valleys in winter. The spruce hen is found in the evergreen thickets of lumbering districts. A similar grouse once common in the wooded districts of the Middle States is now found only in the oak woods of Martha's Vineyard where a sea wall has protected it from extermination.

See QUAIL; PARTRIDGE; PTARMIGAN; CAPERCAILZIE; GUINEA FOWL.

Grundy, Mrs., an invisible character in Thomas Morton's comedy, *Speed the Plough,* published in 1798. Dame Ashfield, one of the *dramatis personae,* is constantly asking, "What will Mrs. Grundy say?"—but Mrs. Grundy never appears. The question has become proverbial, and "Mrs. Grundy" a synonymous term for the opinion of conventional society.

Guadeloupe, gwä-da-lo͞op′, an island of the West Indies. It consists really of two islands separated by a narrow channel. It was discovered by Columbus in 1493 and has belonged to the French since 1634. With a few adjacent islets, it has an area of 688 square miles and a population of 182,000. It is noteworthy as being one of the few French possessions in the new world. There are 11,000 children in school. The trade is chiefly with France. It amounts to about $4,000,000 a year. Sugar, coffee, cocoa, and rum are the principal exports. Slavery was abolished in 1848. The island is of volcanic and coral formation. There are still columns of smoke, and boiling springs. Earthquakes occur.

Guam, gwäm, a volcanic island, the most southern of the Ladrones. It is situated in the Pacific, 1,500 miles east of the Philippines. It has been occupied by the United States since 1898 as a coaling station. Its area is about that of Rhode Island. There are about 13,300 inhabitants,

chiefly of Malay origin, said to be poor, ignorant, and squalid, but peaceful and pious. The use of domestic animals, together with tobacco, melons, hemp, rice, sugar-cane, coffee, and bananas has been introduced. A large part of the island is covered with jungles in which several kinds of timber, valuable for furniture making, are found. The cocoanuts, pineapples, and breadfruit are of a superior quality. Rats, bats, harmless centipedes, scorpions, and brightly colored birds are found in the island, but there are no ferocious wild animals. Missions have existed for some time. Schools have been established by the United States government. See UNITED STATES.

Guano, gwä′no, the excrement of birds. Commercial guano, used by gardeners for a fertilizer, is imported in sacks from rainless islands off the west coast of South America. On account of penguins, gannets, and other birds, immense amounts of guano have accumulated. Humboldt in his travels, 1804, was the first to call attention to the chance of making money by its sale, and its desirability as a fertilizer for land. One ton of guano is considered equal to thirty-four tons of barnyard manure. One small group of low rocks off the coast of Peru is reported to have yielded 14,000,000 tons of guano, valued at $840,000,000, before the supply was exhausted. Both Chile and Peru have derived large sums of money from these deposits, but they are now about at an end. To realize their magnitude, we have only to recall that these comparatively small tracts were used as breeding grounds for centuries by millions of birds larger than geese, and that no rain fell to carry the guano away. The Germans have found a supply on the coast of German Southwest Africa. See PERU; FERTILIZER.

Guatemala, gwä-tē-mä′la, a republic of Central America. Its independence dates from 1847. It extends from the Caribbean Sea to the Pacific, and lies adjacent to Mexico. If we except British Honduras, it is the most northerly country of Central America. The area is 48,290 square miles. The population in 1919 was estimated at 2,003,579. About sixty per cent of the inhabitants are Indians. The whites are engaged chiefly in the management of plantations, or in commerce. The chief exports named in order of importance are coffee, rubber, hides, sugar, timber, bananas, and cocoa. Other products are tobacco, molasses, wheat, corn, and beans.

At the present time there are 423 post-offices, 4,512 miles of telegraph lines, 1,334 of telephone lines and 400 miles of railway. Boats ply between the Caribbean coast and New Orleans and other Gulf ports. Gold, silver, lead, tin, copper, sulphur, salt and other minerals are found, but there is little mining. The interior is mountainous. The larger portions of the country are covered with heavy forests, some of which have never been explored. Gigantic mahogany, ebony, and rosewood trees abound. As may be expected in tropical countries, the birds, insects, and flowers are brilliant. The roads of the interior are mere cart tracks, impassable during the rainy season. The latter begins in May and lasts six months, during which rain falls almost daily in torrents. The capital is Guatemala, a city of 90,000 inhabitants.

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Area, square miles	48,290
Forest area, acres	1,316,482
Population (est.)	2,003,579
Chief Cities:	
Guatemala	90,000
Coban	30,770
Quezaltenango	28,940
Totonicapan	28,310
Number of departments	23
Members of Council of State	13
Members of house of representatives	10
National revenue	$127,249,490
Bonded indebtedness	$ 5,000,000
Coffee, pounds	111,112,000
Sugar, pounds	42,000,000
Rice, pounds	5,190,000
Bananas, bunches	10,000,000
Chicle, pounds,	407,195
Domestic Animals:	
Horses and mules	114,451
Cattle	655,386
Sheep	402,124
Goats	58,847
Swine	176,515
Imports	$ 10,000,000
Exports	$ 15,000,000

Guava, gwä′vȧ, a genus of shrubs and small tropical trees. The common or white guava is from seven to twenty feet in height, and bears smooth, yellow, pear-

shaped fruit, the size of a hen's egg. The rind is thin and crisp. The pulp is flesh colored, sweet, and aromatic, full of bony seeds. The rind is used for marmalade. Very excellent preserves are made of the pulp. The guava is cultivated in the East and in the West Indies.

Guayule, wy-u'le, a rubber plant of recent prominence. It is a bushy shrub of the desert, growing knee high to a horse. The stem does not exceed three inches in diameter. Unlike other rubber-producing plants, it does not yield a milky juice by tapping. The rubber of the guayule is scattered in minute granules throughout the tissues of the branches, stems, and roots, but particularly in the bark. The guayule shrub grows abundantly in Northern Mexico and in adjacent parts of Texas. The natives pluck up the plants by the roots and pack them on burros to baling machines. The bales are transported by pack trains or wagons to a railway station. Pack trains of burros laden with bales of guayule come not infrequently forty miles to a station. The bales are taken in car lots to factories. The guayule is first ground in a mill; the meal thus made is ground to a fine powder by tumbling in a cylinder with heavy stones. Several million dollars' worth of guayule have been shipped from northern Mexico. Attempts to cultivate the plant in Texas, New Mexico and Arizona have not been very successful. Irrigation is necessary to start the plant. Plants grown by irrigation develop rapidly, but their production of rubber is far below that of the wild plants. The method of extracting dust is guarded carefully.

Gudgeon, gŭj'ŭn, a small fish of the carp family. It is about eight inches long. It has a narrow, cylindrical body with a small barbel or feeler at each corner of the mouth. It is distributed throughout the fresh waters of Europe. Gudgeons keep close to the bottom of the streams or lakes. They are very easily taken with the hook and with any sort of bait. In popular usage, a gudgeon is a person easily deceived—one who swallows a bait readily.

Guebers. See FIRE WORSHIPPERS; PARSEES.

Guelder-Rose, gĕl'der-rōz, a cultivated variety of viburnum. It is related to the high bush cranberry and is not a rose at all. The white flowers are barren. Instead of forming flat cymes, the blossoms are collected in a large globose head or ball. It is called usually the snowball tree. It is hardy, and is planted in lawns and other places for ornamental purposes. When in flower it is a handsome plant. The foliage is also attractive.

Guelfs and Ghibellines, gwelfs and gib'e-linz, in Italian history, the names of two great factions. During the Middle Ages the conflicts of these parties filled the pages of history. The names arose in Germany from rival contestants for the imperial dignity. In Italy the Guelfs were identified with the cause of the pope, that is to say, the church, and of the free or independent cities. The Ghibellines were the party of the emperor. See FREDERICK BARBAROSSA.

Guelph, Ontario, Canada, an industrial city and the county town of Wellington County, is on the Speed River, a water power stream, and is 48 miles west of Toronto, and 28 miles north of Hamilton. It is served by the Canadian Pacific and the Grand Trunk railroads. The river at this point has a fall of thirty feet, developing power for manufactories of automobile tires, motor trucks, general rubber goods, boilers, malleable and cast iron ware, gas engines, hats, linen goods, carpets, sewing machines, pianos, steel and wire goods of various kinds, clothing and machinery.

Guelph lies in the center of a prolific agricultural region, and the Provincial Winter Fair and Fat Stock Show attracts thousands of people each winter. Besides the public schools, which number eighteen, the city contains the Ontario Agricultural College, a noted institution, and Macdonald Institute of Household Science. All public utilities are owned and controlled by the municipality, whose citizens numbered 18,128 in 1921.

Guerrilla, gĕr-rĭl'lă, a Spanish word meaning skirmishing warfare, and hence a body of skirmishers. The word is akin to the French *guerre, meaning war.* In European warfare the term was used to designate a light body of troops calculated to do scouting or to surprise the enemy. The

word came into prominence during the invasion of Spain by French armies in the Napoleonic Wars. Of late the word has acquired a sinister meaning. During our Civil War bands of guerrillas responsible to nobody, little better in character and deed than bandits and horse thieves, roamed the borders, especially in Missouri, plundering and murdering. Quantrell, the James Brothers, and the Younger Boys were products of the guerrilla bands. Guerrillas are now associated in the popular mind with raiding, looting, train robbing, and the like.

Guess, George. See CHEROKEE; SEQUOIA.

Guiana, gē-ä′nä, a tract of South America, lying on the Atlantic, between Brazil and Venezuela. It lies between the basins of the Amazon and the Orinoco. It is drained by a number of rivers. It is divided into three sections. Dutch Guiana in the middle has for its capital and seaport Paramaribo; the capital of French Guiana on the east is Cayenne, noted for the so-called pepper of that name; the capital city of British Guiana on the west is Georgetown. British Guiana has about 90,000 square miles of area, Dutch Guiana about half as much, and French Guiana about one-third as much. The coast is low and swampy. Tropical vegetation has grown far out into the sea. The interior rises gradually into low mountain ranges rich in gold, iron, sapphire, diamonds, mercury, garnets, and plumbago. The mineral wealth has, however, been little developed.

The surface of the coast is exceedingly rich. The river valleys are clothed with tropical vegetation of great density and enormous height, resembling that of the Amazon. There are several hard, heavy woods valuable for furniture and cabinet-making. The forests are almost impassable, save by way of the rivers. The enormous water lily, known as the Victoria Regia, is native in this region. Orchids climb from tree to tree. The region is a paradise for the sloth, deer, anteater, armadillo, peccary, jaguar, tapir, monkey, innumerable bats, the manatee, alligator, and boa constrictor. Tropical birds of brilliant plumage, including tanagers, orioles, and hummingbirds, are found in abundance. It is said that the insects of this region, especially the flies and beetles, are unrivaled for brilliancy of color.

The productions and commerce of the three districts are monopolized by the countries to which they belong. Cacao, sugar, coffee, bananas, rice, maize, rum, molasses, gold, timber, precious woods, diamonds and charcoal are exported. The population is a mixture of Indians, Italians, coolies from the East Indies, Chinese, Spaniards, and Portuguese, with, of course, a dominant colony of officials and traders in every district, representing the country to which it belongs.

Guide Bird, or **Honey Guide,** a bird related to the barbet and woodpecker. The toes are arranged in pairs for climbing. The head is large and the bill is heavy. There are a dozen species in the family. One inhabits India; another is found in Malacca; a third in Borneo. The rest are birds of South Africa. The Latin or systematic name is indicator, referring to the desire of these birds to point out the place where bees have stored honey. They are fond of bees' grubs, but can't get at them always. A honey guide will attract the attention of a traveler or hunter and flit on from tree to tree, leading the way to a hollow tree or crevice in a rock where a swarm of bees is at work. The guide sits patiently by for a share of the proceeds. Sometimes the swarm is difficult to locate after the guide has indicated the vicinity. In that case the guide is likely to lead off for a second swarm. The indicator is no judge of property. As like as not he will lead the honey hunter into someone's bee yard. He is charged also with practical joking. It is said that he will at times lead an eager bee hunter into the presence of a leopard. a rhinoceros, or a lion, and make off with a jeering laugh like that of a parrot.

Guido Reni, gē′dō rā′nē (1575-1642), an Italian painter. Bologna was his birthplace and the seat of his studies. When but a young man he painted the *Crucifixion of Saint Peter,* now in the Vatican. The picture won him fame, and he left the mark of his genius on many a palace and Roman Catholic cathedral. His best-known picture, *Aurora,* was painted on the

ceiling of a famous Italian palace. Other of his well-known pictures are *The Murder of the Innocents, Lot and His Daughters, Magdalen,* and *Christ Wearing the Crown of Thorns.* See PAINTING.

Guild. See GILD.

Guildhall, the council hall of London. It is situated near the very heart of historic London at the end of King Street, leading a block aside from the rattle and clatter of Cheapside. It is an irregular building, or rather a group of connected buildings. If fires and enlargements be taken into consideration, we may say the first foundation was laid in 1411 and the last roof put on in 1885.

The great hall is a central audience room, where citizens transact such public business as the election of a lord mayor and city members of Parliament. It was put in repair in 1865 at an expense of $150,000. It is a large handsome hall 153 feet long and 48 feet wide. A remarkable open timber ceiling is 55 feet above the floor. There are stained glass windows representing the armorial bearings of Queen Victoria and of the city. The walls are adorned with statues and busts of Lord Chatham, Wellington, Nelson, William Pitt, Mayor Beckford, Beaconsfield, and Gladstone. Every ninth of November the Lord Mayor on his induction to office gives a dinner here to a thousand invited guests. It is not beneath the dignity of the prime minister to be present and to make an after-dinner speech in which the policy of the government is defined.

The new common council chamber and the aldermen's room are other parts of the building reached by passages. They are adorned by busts and historic paintings. Among the latter are the *Siege of Gibraltar* by Copley and the *Death of Wat Tyler* by Northcote.

The Guildhall library, built in Tudor style, contains 40,000 volumes, including rare specimens of early printing. It is the aim of the custodians to center here a complete collection of all books, manuscripts, descriptions, prints, plans, or pictures that in any way throw light on the history of London. A department, known as the museum, contains a wonderfully interesting collection of Roman antiquities found in London. There are groups of sculpture, six-sided marble columns, Roman pavements, stone coffins, statues, and thousands of lamps, vases, dishes, goblets, spoons, trinkets, pins, needles, and the like found in excavating old Roman walls at Bishopsgate, in cutting down Ludgate Hall, and elsewhere.

Guillemot, gĭl′le-mŏt, a web-footed bird closely related to the loon or else to the extinct auk. It nests on the ledges of rocky cliffs along both shores of the North Atlantic, laying a single white, pear-shaped egg, about three inches in length. The bird is said to carry its young on its back from the cliff to the water. Prodigious numbers nest together on these rocks. Until lately, at least, they were so unaccustomed to danger from man that they allowed themselves to be taken by hand; hence the term, "foolish guillemot." The wings are very small, yet the bird flies reasonably well. The legs are placed well back like those of a loon, which, indeed, the guillemot resembles more than any other bird with which inland Americans are at all familiar. It is an expert diver and lives on a fish diet. See AUK; LOON.

Guillotine, gĭl′lo-tēn, a contrivance for beheading condemned criminals. In 1792 the French Assembly decided, on motion of Dr. Guillotin, to adopt a beheading machine described by him. Dr. Guillotin deprecated the use of the sword or ax as open to accident and as brutal. He proposed to revive a machine formerly used in Scotland and Germany. A young German mechanic by the name of Schmidt was authorized to construct eighty-three of these new instruments, one for each department of France, for the sum of $100 each. The new machine was called a guillotine, after the name of the physician who recommended it. The guillotine consists of a heavy base, two upright posts, with a crosspiece at the top, and a heavy, weighted knife with an oblique edge. The knife slides in grooves of the upright posts. The knife is raised to the top of the grooves; the victim is strapped to a plank, face downward, so that his neck is directly beneath the knife; a spring is touched; the heavy, keen-edged knife descends, and the criminal's head is severed as easily as a sharp razor cuts a hair. No

one at the time had any idea that the guillotine would play so great a part in the horrors of the Revolution. Dr. Guillotin himself came very near being a victim of the instrument which bears his name. He was thrown into prison during the reign of terror but was released on Robespierre's death and resumed the practice of medicine in Paris. He died in 1814. See FRENCH REVOLUTION; REIGN OF TERROR.

Guinea, gĭn'e, a region of West Africa bordering on the Gulf of Guinea. It extends along the coast for 3,500 miles. It is divided into a number of regions, as the Ivory Coast, the Slave Coast, and the Gold Coast. It is now held by several European nations. The Niger is the chief river. The heat is intense. Rainfall is abundant. Vegetation is rank. Wild animals attain their full size and number. A large number of the slaves of the United States were stolen from this region. See NIGER.

Guinea, an English gold coin. Its name arises from the fact that it was coined first from gold obtained in Guinea. It is equivalent to twenty-one shillings, and corresponds closely to our five dollar gold piece. It was first coined in 1663, in the reign of Charles II, whose profile appeared on one face of it. Directly beneath the head of the king is a miniature figure of an elephant. The coinage was discontinued in 1817, but the guinea is still used in accounts. The term is rather poetic. Burns says:

> The rank is but the guinea's stamp
> A man's a man for a' that.

Tennyson also uses the term:

> But the jingling of the guinea helps the hurt that Honour feels.

See COIN.

Guinea Fowl, an African grouse well known in domestication. Also called guinea hen and pintado. The common species has an exceedingly plump, high-arched body as large as that of a hen. Its plumage is slate-colored and is covered with round white spots. It has large wattles and a naked head surmounted by a calloused crest. It is still common in many parts of Africa, feeding in flocks. The Romans prized the flesh and eggs of the guinea fowl and gave it a name embodying the pretty notion that its spots represented the tears of sisters shed for the death of an only brother. Many American housewives have kept a few of these birds about the barnyard from a notion that their harsh screech frightens the chicken hawk away. The tyrannical disposition of the male is a source of so much disturbance that the guinea fowl is not a favorite with poultry raisers. The scarcity of genuine game birds, however, has led in city restaurants to the substitution of guinea fowl for them. See GROUSE.

Guinea Pig, a little animal related to the South American capybara. It is considered the type of a family midway between that of the hare and the porcupine. The name is a striking illustration of the confusion existing in popular names, for this animal is neither from Guinea nor is it in any way a pig. It has been suggested that the name may be a corruption of Guiana in South America, the region of which this animal is a native. Naturalists prefer the name of cavy. There are several wild species no one of which has the coloring of the domestic guinea pig. It was brought to Europe soon after the discovery of America, and has been a common household pet ever since. It is about eight inches in length. The guinea pig multiplies with greater rapidity than any other quadruped, exceeding even the rabbit in this respect. It produces from four to twelve young when it is only two months old, and gives birth to a litter at intervals of two months thereafter. It is an exceedingly inoffensive and defenseless animal. The flesh is eaten by the Peruvians. Guinea pigs are offered like rabbits in the markets of Manila, and seem to be relished.

Guinevere, in the Arthurian legends, the daughter of Leodogran, king of Camelyard. She was the most beautiful of women and became the wife of King Arthur. She proved untrue to her husband, and thus set in motion the chain of events which led finally to the disruption of his kingdom and his overthrow in battle. Tennyson has told the story of Guinevere's guilt, her remorse, and her holy life thereafter in his *Idylls of the King*. See IDYLLS OF THE KING; ARTHUR.

Guise, gēz, a ducal family of France. The country of Guise was made a duchy in 1528 by Francis I. The founder of the family left eleven children. Marie Guise married James V of Scotland and became the mother of Mary, Queen of Scots; François succeeded his father as Duke of Guise; Charles became cardinal of Lorraine; Louis, cardinal of Guise. All were noted for ability and intriguing. When the young and feeble Francis II, son of Henry II and Catherine de Medici, ascended the throne, and Mary, the young Scottish princess, became his wife, her powerful uncles, the Guises, through her governed the king and ruled France. Opposed to them were the Bourbon princes, the king of Navarre and his brother, the prince of Condé, and the Huguenot, Admiral de Coligni. On the death of Francis II and the return of Mary to Scotland, the Guises were reluctant to surrender their power. Trouble continued between the Guises and the Bourbons, fomented by the unscrupulous queen-mother, Catherine de Medici, who played off one party against the other in order to keep the power in her own hands. The Massacre of St. Bartholomew was followed some years later by the assassination of the Duke of Guise, the last of that family, and on the assassination of Henry III in 1589, Henry of Navarre succeeded to the throne. See BARTHOLOMEW, MASSACRE OF ST.; MARY, QUEEN OF SCOTS; COLIGNI.

Guitar, gĭ-tär′, a stringed instrument of the lute class. There are six strings, three of catgut and three of silk wound with fine silver wire. They are stretched over a violin body having a long neck and finger board. They are plucked with the fingers of the right hand and fingered like those of a violin with the left hand. The guitar has a soft, particularly agreeable tone, suitable for accompaniments. It is the favorite musical instrument of the Spanish and is popular in all countries. See LUTE.

Guizot, gē-zō′, **Francois** (1787-1874), a distinguished French statesman and historian. He was born at Nimes. At the age of twelve he resided in Geneva. In 1805 he took up the study of law in Paris. Seven years later he was made assistant professor of literature. Soon after he was called to a newly established chair, that of modern history in the Sorbonne. He began writing for publication as early as 1816. The titles of his published works exceed thirty. A translation of his *History of Civilization in Europe* was for several decades a popular college text. He taught that civilization is the outgrowth of large factors and that men—even Napoleon—are but instruments. He held a number of state offices. In 1828 he was elected to the chamber of deputies. In 1830 he became minister of the interior and continued to hold important ministerial positions until 1848. In theology he was a Calvinist; in politics he was a supporter of the temporal sovereignty of the pope and of the Bourbon dynasty in France. Guizot stood for freedom, character, and education. See ROLLINS; LAMARTINE.

Gulf Stream. See CURRENTS, OCEAN.

Gull, a family of aquatic birds closely allied to the tern. There are some fifty species. The gulls are found both on maritime and inland waters. They have webbed feet and rest much of the time on the water. When weary the gull tucks its head under its wing and sleeps, literally in the cradle of the deep, riding the waves like a ship. They feed chiefly on food floating on the surface. The ivory gull, pure white, seventeen inches long, spends much of its time amid the pack ice of Arctic seas. The kittiwake, so called from its cry, is a bird of the same size, with a blue-gray back and black-tipped primaries. In America it breeds from the St. Lawrence and northern Minnesota to the Arctic Ocean. The burgomaster is a large gull, twenty-eight inches long. The American herring gull, pearl gray above and white beneath, with black wing marks, breeds from Maine, Minnesota, and Puget Sound northward, wintering along the Central American, the South Atlantic, and Gulf coasts. Large numbers migrate by way of the Mississippi Valley. Gulls nest in colonies, chiefly on the ground or on rocky shores. Flocks follow ocean-going steamers 1,000 miles from land. The gull is not a suspicious bird, whence the term, "gullible," is not infrequently applied to persons easily taken in by sharpers. The

gull is a characteristic feature of the sea shore. Holmes gives some delightful glimpses of gull habits in *My Aviary*.

The gull, high floating, like a sloop unladen,
Lets the loose water waft him as it will;
. . . . . .
I see the solemn gulls in council sitting
On some broad ice-floe pondering long and late,
. . . . . .
The pale bird, kindling like a Christmas feaster
When some wild chorus shakes the vinous air,
Flaps from the leaden wave in fierce rejoicing,
Feels heaven's dumb lightning thrill his torpid nerves,
Now on the blast his whistling plumage poising,
Now wheeling, whirling in fantastic curves.
Such is our gull: a gentleman of leisure,
Less fleshed than feathered; bagged you'll find him such;
His virtue silence; his employment pleasure;
Not bad to look at, and not good for much.

Gulliver's Travels, a prose romance by Jonathan Swift, published in 1726. It is a satire on the social and political conditions existing in England during the early part of the eighteenth century. Lemuel Gulliver, a blunt but honest ship's surgeon, describes four voyages, one to the country of Lilliput, where a man is no larger than the traveler's little finger; a second to Brobdingnag, where the inhabitants and all else are on a gigantic scale,—wheat as tall as oaks, thimbles as large as buckets, and wrens as big as turkeys; a third to the flying island of Laputa, inhabited by philosophers and astronomers; and a fourth to the country of the Houyhnhnms, where horses are the reasoning beings and men, called Yahoos, are degraded and unreasoning brutes. The characters introduced, the habits and political conditions described, were easily recognizable as real persons, real customs, and real political ideas in England. In the first voyage the satire is light and playful, but it grows extremely bitter as the tale advances. The plan of the romance gave Swift an excellent opportunity to hold objectionable people and public measures up to ridicule and spiteful remark. This part of the interest has faded, but *Gulliver's Travels* is still a notable book, one of a short list that every intelligent reader must know.

In the voyage to Laputa the satire is directed against the vanity of human wisdom, and the folly of abandoning useful occupations for the empty schemes of visionaries. The philosophers of Laputa had allowed their land to run waste and their people to fall into poverty, in their attempts to "soften marble for pillows and pincushions," to "petrify the hoofs of a living horse to prevent them from foundering," to "sow land with chaff," and to "extract sunbeams from cucumbers," which were to be put in phials hermetically sealed, and let out to warm the air in raw, inclement summers.—Tuckerman.

Whether we read it, as children do, for the story, or as historians, for the political allusions, or as men of the world, for the satire and philosophy, we have to acknowledge that it is one of the wonderful and unique books of the world's literature.—Gosse.

Gum, a product collecting on the stems and branches of many plants. It is formed usually by the sap which exudes and dries up. A true gum differs from a resin. It may be dissolved, or at least softened, in water, while water has little or no effect on resin. On the other hand, a resin dissolves in alcohol while a gum does not. The dried sap of the caoutchouc or rubber tree is popularly called gum elastic, but, properly speaking, it is not a gum.

Of the true gums, gum arabic is best known. It is collected in the form of tears from several plants, particularly an acacia of Arabic and southern India. A variety called gum senegal is collected in tropical Africa. It must be gathered by hand. London imports half a million dollars' worth of gum arabic annually. Mixed with sugar, honey, or glycerine to prevent cracking, it makes the best of mucilage, especially for labels. It is employed in medicine and in making confectionery. Used as a size, it imparts luster to silk and other fabrics. We buy $500,000 worth a year from the Mediterranean countries.

Gum tragacanth is collected also by hand from several low shrubs of Asia Minor. They are known locally as goat thorns. The gum occurs in flakes, or in a thread-like form to which the name of vermicelli is given. Smyrna is the chief city of export. This gum is used by the pharmacist to give firmness to pills and lozenges. It makes an excellent mucilage. It is also employed as sizing to give stiffness to crepe and calico, and by the hat maker to stiffen his felt. We import half a million dollars' worth yearly.

Chewing gum was originally resin picked from the bark of the spruce and cherry tree.

The demand has so far exceeded the supply that makers now rely largely on chicle gum. It is pressed from the milky juice of a South American evergreen tree, sometimes called the sapodilla. Much of the chewing gum on the market, however, consists almost wholly of paraffine, sweetened and flavored. The ingredients are kneaded to a stiff dough, which is then passed between rollers. These rollers are set at the right distance apart to produce a sheet, and are at the same time provided with sharp ridges that cut the sheet into oblong pieces. These are then dried, wrapped in paper, and sent to market.

See CHICLE.

Gumbo, a name given to the unripe pods of a plant of the hibiscus family which is native to the West Indies, but will grow in any tropical or sub-tropical climate. The plant is an annual, growing from two to three feet high. It has a soft, herbaceous stem, and sulphur-colored flowers. The pods are rich in nutritious mucilage and are highly prized in the East and West Indies, and in southern United States. They are cooked, dressed with butter and served as a vegetable, or are used to thicken soup which is sometimes called gumbo. The seeds of this plant are used as a substitute for coffee. The stalks furnish a fiber which in India is used for making twine, sacking, etc., but is inferior to hemp and jute. Okra is another name for gumbo. Both words are probably of Indian or negro origin.

The word gumbo is applied also to a patois or vulgar dialect in use among the creoles and negroes of the West Indies and Louisiana. In the western and southwestern parts of the United States the name gumbo is applied to a particularly fine-grained soil having the plastic qualities of clay. When wet this soil forms a tough, waxy mass, when dry it breaks into hard lumps. Such soils are difficult to till but show improvement under cultivation.

Gun, a strong metal tube designed to direct the flight of a bullet or other projectile. The bullet is expelled forcibly by a gas due to the ignition of gunpowder or other explosive. In its original sense the term includes not only pistols, revolvers, shotguns, rifles, muskets, and firearms of every description, but the largest cannon as well. Guns, that is to say, small cannon, or firearms, were used in warfare for the first time at the battle of Crecy, 1346. See FIREARMS; CANNON.

Gun Cotton, a violent explosive. It is prepared by soaking cotton waste in the same acids that form nitroglycerin. After washing and treatment too detailed for description, it may be used loose, or it may be compressed into small cakes like gun wads by a pressure of from four to six tons per square inch. It is almost smokeless, and is used as a substitute for gunpowder. It is the forerunner of dynamite by which it has been supplanted for purposes of blasting. It does not keep well and often explodes spontaneously. See DYNAMITE.

Gun-Metal. See ALLOY.

Gunny, a sort of cloth made from jute. It is much used in the manufacture of sacks called gunny bags. The bags are made in large numbers in India. The exports for a single year reach nearly 100,000,000 bags. In the United States they are used chiefly for the covering of cotton bales and for bags in which to ship grain. They are light and strong, but rot quickly on exposure to moisture. They are not sufficiently durable for farm use. See JUTE.

Gunpowder, a well known explosive. Historically gunpowder, or something very like it, was known to the Chinese and possibly the Hindus from the remotest times, and was employed by them in the making of fireworks, especially rockets. The credit of its invention has been given Roger Bacon about 1250, or to the German Schwarz, 1330; but the probabilities are that the Moors brought the knowledge to Europe about this time. Powder was used in the battle of Crecy, 1346, but its common use in warfare began two centuries later. In England the manufacture began in Queen Elizabeth's time. Common gunpowder is a mixture of the following ingredients, which are ground fine and incorporated thoroughly:

Material.	Theoretical.	Musket.	Blasting.
Saltpeter	74.83	76	62
Charcoal	13.31	14	18
Sulphur	11.86	10	20
	100.00	100	100

American powder mills use 175,000 bushels of charcoal and 1,300 tons of sulphur a year. A spark from a gun cap or a hot iron causes gunpowder to explode or pass instantaneously into gases which occupy 280 times the space required by the powder itself. The gas exerts a pressure in a gun barrel of 100 atmospheres upward according to the charge, etc. The manufacture of gunpowder is a dangerous business. Powder mills are located usually in a lonely locality, and workmen take every precaution; yet accidents are not infrequent, and powder mills blow up with loss of life and property. After the grinding into a fine dust, several operations follow, including the pressing into cakes and crushing into grains, which are polished and sifted into powder of different sizes. A Smokeless powder is now in general use by sportsmen and for military purposes.

Gunpowder Plot, in English history, an attempt to blow up the House of Parliament. It was arranged by a desperate knot of Catholic gentlemen, whose motive was partly political, partly religious. They caused barrels of powder to be conveyed by way of the Thames to the cellar under Parliament House. Guy Fawkes, a Yorkshire soldier of fortune was engaged to explode the powder on the night of November 5, 1605, at the opening of Parliament, when King James was expected to be present. The plot failed and the leaders and Fawkes were executed.

Gunsaulus, Frank Wakeley (1856-1921). An American clergyman, educator and author, born at Chesterfield, Ohio, and educated at Ohio Wesleyan University. In 1875, he entered the ministry of the Methodist Episcopal Church, but changed to the Congregational Church in 1879. Dr. Gunsaulus came to Chicago in 1885 as Pastor of Plymouth Church. In 1899, he became pastor of the Central Church, holding this position until 1919. In 1893, he was chosen president of Armour Institute and remained head of the institution until his death. Dr. Gunsaulus had an international reputation as a preacher and lecturer. Among his works are *Monk and Knight, Transfiguration of Christ, The Minister and the Spiritual Life.*

Gustav V (1858-), king of Sweden since the death of his father, Oscar II, in 1907. He was born at Drottingholm, entered the army in 1875, and studied at the University of Upsala in 1877-78 and 1880. During a part of 1878 and in 1879 he traveled extensively in Europe, visiting almost every country. In 1881 the future king married Victoria, daughter of the Grand Duke of Baden; they have five sons. From 1884 to 1891 he served as Regent of Norway, during the illness of his father, and became lieutenant-general in 1892. Because of his father's frequent illness, Gustav often acted as regent; and when he came to the throne he was well prepared for the duties of office. King Gustav aroused Liberal and Socialist criticism when, during a speech at a mass meeting of 40,000 peasants in 1914 he advocated increased armament. He favored the German cause in the World War.

Gustavus I, the founder of the family, is known in history as Gustavus Vasa. He was born at Lindholmen, May 12, 1496, and died at Stockholm, September 29, 1560. He studied at Upsala. He is a heroic figure in history. Since the Union of Calmar in 1397 Sweden had been subject to Denmark. Vasa placed himself at the head of a Swedish party. After various strokes of fortune and misfortune, during one period of which he worked, disguised as a laborer, in the mines of Dalecarlia, he secured the independence of his country. He was elected king in 1523. He was of the party that carried Sweden into the Lutheran church.

Gustavus II, called by way of distinction Gustavus Adolphus, was a grandson of the former. He was a soldier from childhood. He was born at Stockholm in 1594 and ascended the throne in 1611. He inherited three wars, with Russia, Denmark, and Poland. He was fortunate in having a prime minister by the name of Axel Oxenstiern,—a very Bismarck. Leaving home affairs in competent hands, Gustavus threw himself into the campaign with a vigor that won for him the title of the "Lion of the North." He compelled Russia to cede territory and conclude a peace. Poland and Denmark were glad to come

to terms. The German emperor was aiming to root out Protestantism. Gustavus Adolphus entered the field as the champion of the northern Protestants. He won a victory over the great imperial general, Tilly, at Leipsic September 17, 1631. November 16th of the following year he won the battle of Lützen from the famous Wallenstein, but fell in the hour of triumph. The battlefield is a few miles from Leipsic. A block of granite under a Gothic canopy marks the spot where Gustavus fell. He was a great soldier. He taught Europe that a small, efficient, well disciplined army is superior to an armed mob. He considered 40,000 troops the limit of effectiveness. A larger number of soldiers he regarded as a hindrance.

Gustavus III, reigned from 1771 to 1792. His reign is marked by strife. He struck at the power of the nobles, reducing their council to the rank of an advisory committee. This measure was popular, but during a war with Russia a few of the disaffected nobles formed a conspiracy and procured his assassination. His taking off was like that of President Lincoln. He was shot at Stockholm in the opera house, March 16, 1792. With this monarch constitutional government began in Sweden.

Gustavus IV succeeded his father, Gustavus III. He antagonized the French and joined the German princes against Napoleon. He managed badly. He alienated his people by taxes, engaged in a useless war with Russia, lost Finland to that power, cast away the friendship of England, and was expelled finally from his country. French influence demanded his exile. He refused a pension from the Swedish treasury and died in poverty at St. Gall, Switzerland, February 7, 1837. He was succeeded by Charles XIII, then by Bernadotte. See WALLENSTEIN.

Gutenberg, Johann (1400-1468), the first German printer. He is credited with the invention of printing with movable type. He was born at Mainz. The Gutenbergs with others were expelled from that city in 1420, and appear to have removed to Strasburg. We hear of young Gutenberg imprisoning the town clerk for a debt due him by that city, and of his being sued for a breach of promise. The former affair was settled by the mayor of the city; the latter was adjusted by marriage.

Gutenberg appears to have been an inventive sort of man. He had a plan for polishing precious cut stones, and another for manufacturing looking glasses to be sold to pilgrims. He aimed to form a company for the manufacture of type, but, failing in this, returned to Mainz where he formed a partnership with a wealthy and shrewd goldsmith named John Fust. Types were cast and the first printing office opened. The first book printed was a large Latin Bible, the printing of which occupied from 1450-1455. Gutenberg and Fust appear to have had a falling out; the latter, having advanced the money, kept possession of the type and press. Gutenberg was turned out in the world penniless. He made other attempts, unsuccessfully however, to engage in business. In 1465 we find him in the service of the archbishop, who gave him a suit of clothes and a fixed allowance of corn and wine annually. Although the value of his invention was priceless Gutenberg died poor, childless, almost friendless, and quite unknown. It is said that his name did not even appear on the title page of anything that he printed.

In 1858 a fine monument was erected in his memory in the chief square of Frankfurt, a city in which printing has ever been held in repute. The monument is a work of art well worth examination. It consists of a group. The central figure is, of course, Gutenberg, holding a handful of type. No portrait or picture is known. The face that appears on medals, statues, etc., is entirely supposititious.

See ALDINE; ELZEVIR; PRINTING; BOOK.

Guthrie, Okla., the county seat of Logan County, was made the capital of Oklahoma Territory in 1890 and held that position in the state until 1911. It is on the Cottonwood and the Cimarron rivers and on half a dozen railroads, 31 miles north of Oklahoma City, the present capital. Due to its mild climate and to the discovery a few years ago of mineral springs, the city has attained some prominence as a

health resort. It is in an advantageous trade position, and its manufactures include flour, cotton-seed oil, furniture, brooms, foundry products, plows and creamery products. It is the seat of Methodist University and St. Joseph's Academy, and there is a Carnegie library. Population, in 1920, 11,757.

Gutta Percha, the dried, milky juice of a large spongy tree found mainly in the Malay Peninsula, Java, Borneo, and Sumatra. It resembles rubber, but it has very little elasticity, and is a distinct substance. The natives cut down the trees to obtain the product. When placed in hot water pieces soften, become sticky, are molded readily, and, when placed under pressure, cohere firmly. Gutta percha is a nonconductor of electricity, and for that reason is used largely to insulate wires. No other substance seems to do as well for coating submarine cables. Of late a demand has sprung up for gutta percha in the manufacture of golf balls, causing a scarcity and a sharp advance in price. Complaint is heard that a fashionable sport is hastening the destruction of the gutta percha forests and actually endangering the future of ocean telegraphy. Gutta percha corrodes rapidly, however, and a more durable substitute for marine work is desirable. Wireless telegraphy may solve the problem. Surgeons occasionally use gutta percha for splints. A sheet of this substance softened in hot water may be pressed to the shape of the limb where it hardens like a plaster cast. See RUBBER.

Guyot, gē-ō′, **Arnold Henry** (1807-1884), a noted geographer. A native of Neuchatel, Switzerland. An associate of Agassiz. During the ten years he held a professorship in his native town Guyot made a study of Alpine glaciers. He taught that ice pours slowly down the ravines under the influence of gravity, not simply as mud would do, but that a constant freezing and thawing takes place within the body of ice. Guyot also investigated the country around the Central Alps, mapping the districts over which Alpine glaciers, formerly of greater extent, had carried boulders. In 1848 Guyot was invited to become a lecturer at Harvard College. These lectures were afterward published as Guyot's *Earth and Man.* Guyot was employed by the Massachusetts board of education to lecture on physical geography, and created a revolution in the teaching of that subject. He also prepared a physical geography, a series of descriptive geographies, and a set of wall maps for schoolrooms. In 1855 he became professor of physical geography and geology at Princeton. Professor Guyot organized a system of meteorological observations for the Smithsonian Institution, and was an honorary member of a large number of learned societies throughout the world. See AGASSIZ.

Gymnasium, in German education, a classical school for boys. The name is derived from that of the Greek school for physical exercises. The gymnasium corresponds in a way to the English grammar school and to the American academy and high school. Boys only are admitted. The course covers nine years. Like our normal schools, the gymnasium is maintained largely, at least, at the expense of the state and is under state management. The courses of study in the gymnasia of a German state are all alike. Instructors, once appointed, hold their positions for life.

These schools are not an extension of the grades. Boys intending to take a gymnasium course leave the graded schools at the age of eight or nine. In the gymnasium there are five or six hours of actual instruction daily. Quite frequently two, or even three, periods of an hour each are given to the same subject. During the course of a day's instruction a boy of nine may very possibly have three distinct exercises in Latin grammar.

The official program of the Prussian gymnasium adopted in 1892 called for 252 units of work distributed as follows: Religion, 19; German, 26; Latin, 62; Greek, 36; French, 19; history and geography, 26; mathematics, 34; science, 18; penmanship and drawing, 12. Nearly three-fifths of the entire course is devoted to languages. Great proficiency is acquired in Latin. The students of the graduating class are expected to turn *William Tell,* for instance, into Latin prose without dif-

ficulty. The course differs from that in American schools in several respects. Instruction in each subject is prolonged throughout the entire course. Science is given two hours a week for nine years; history and geography, from two to four hours for the same time. Few textbooks are used, a large part of the instruction being oral. The students are required, however, to write up notebooks to an extent that would be considered burdensome by an American youth. Even in mathematics, discussions and demonstrations are furnished largely by the instructor. The course, when complete, reaches the Junior year of an American college. Upon receiving his certificate of graduation the student is free to enter any one of the famous universities of Germany.

In addition to the gymnasium there are other schools of like standing that replace Greek by modern languages. Others again, *Realschulen,* give neither Greek nor Latin. The time thus gained is given partly to science and partly to French, German, and English. A German school has but one course of study.

Gymnastics. See ATHLETICS.

Gypsum, jĭp′sŭm, a mineral composed of lime, sulphur, and water. Like marl, it is used as a fertilizer. Gardeners buy it in sacks under the name of land plaster. It is used also in the manufacture of glass and porcelain. When heated to drive off moisture gypsum falls into a powder which has the quality of hardening or setting quickly if moistened again. The most noted gypsum quarries in the world are near Paris, whence the name, plaster of Paris. Plaster of Paris ground fine is much used in the arts. Paperhangers mend walls with it. Plasterers use it in the finer sorts of work. Mixed with glue it is used for stucco work in the execution of cornices, flowers, garlands, festoons, fruits, scrolls, and other ornamental designs. Extensive beds are worked in various countries of Europe, especially England and France. In America, Nova Scotia, New York Michigan, Kansas, and Iowa produce considerable quantities. Gypsum is produced also in Virginia, South Dakota, California, Utah, and Wyoming.

Gypsy Moth, a moth of the Tussock family whose larvae are very destructive to the foliage of fruit and shade trees. The male is brownish-yellow varying to a greenish-brown color. The wings are darker than the body and have black spots. Its zigzag flight is a distinguishing feature of the insect. The body of the female is buff and the wings are nearly white, with black spots. They have an expanse of about two inches, but owing to the size of her body the female is seldom on the wing.

In July and August the eggs are deposited on the branches and trunks of trees, fences and sides of buildings, where the yellowish tan-covered clusters are readily seen. They hatch about the first of May and the caterpillars reach maturity in mid-summer, when they are from two and one-half to three inches long. They are of a sooty color with rows of blue and red spots on the back. They frequently drop on carriages and trains and are carried long distances. They can be destroyed by the usual spraying solutions. (See SPRAYING.) Bands of burlap around the trunks of infested trees will trap many which can be easily disposed of. The eggs should be destroyed in the fall and winter.

Gyroscope. The idea of the gyroscope and its possibilities as a stabilizing agent was evolved from the spectacle of a spinning top, which operates on the same principle of physics. The gyroscope represents in fact the multiplied power of many spinning tops. Its name was given to it by Leon Foucault, a noted French scientist of the last century, and is derived from two Greek words signifying a turning or revolution and a viewing of the same, because the spinning wheel of a gyroscope reminded Foucault of the revolving motion of the earth.

A practical application of the gyroscopic principle was made by Elmer A. Sperry, an American engineer, who perfected the gyro-compass, which has been of great service to mariners. This compass obtains its directive force from the rotation of the earth and always points to the true or geographic north. It is invaluable in iron and steel ships, where the deviation of the old magnetic compass formerly

caused considerable trouble. Mr. Sperry's first gyro-compass was installed on a steamship in 1911, and proved so successful that the entire United States Navy was soon equipped with it, and other naval nations followed suit.

The gyroscope has also been applied to the problem of stabilizing rolling ships at sea and aircraft in the air, and in the direction of automobile torpedoes. Mr. Sperry, the inventor of the gyro-compass, has achieved marked success with auto-stabilizing devices for ships and airplanes. In a test of the Sperry gyroscope on a United States destroyer, for example, the gyros were mounted with their axes horizontal and normally athwartship. Any tendency of the ship to roll would cause the gyros to shift their position so as to counteract that tendency and keep the ship on an even keel. The spinning wheels of the gyros were driven by a motor, and required but little power to keep them in operation. Gyro devices have also been used on an ice-breaking steamship to produce the rolling motion of the ship which is desirable in forcing a passage through ice. Thus the gyro has been made to work both ways at sea—to prevent rolling and to produce it.

In the Sperry airplane stabilizer, a gyroscope with its spinning wheel operated by current from a generator on the shaft of the engine works a pilot valve which operates the horizontal rudders against any tendency of the plane to tip about its horizontal axis, and another feature operates to volplane the machine in case the speed should fall below a critical point. The gyro apparatus stabilizes the airplane both longitudinally and laterally, the lateral stabilizer controlling the ailerons, or wing-tips, through a pilot valve, to prevent tipping of the machine. For airplanes and hydorplanes gyro devices are now constructed of light weight and do not interfere with the ordinary operations of the pilot.

Dr. Schlick of Germany has also met with success in gyroscope stabilizing apparatus for ships at sea. His device is a so-called passive type of gyro, suspended in the vessel with freedom of movement about its axes of rotation and precession. Precession is an important factor in gyroscopy. It is described in mechanics as the cyclic movement of the axis of rotation of a body which revolves about a free axis in a field of force; and gyroscopic precession is the steady motion in which the axis of the top describes a right circular cone about the vertical. It is the resultant of the force of gravity and the centrifugal force caused by rotation.

H

Haakon VII, haw'kōn, (1872-), king of Norway. The name Haakon was borne by a line of Norwegian kings of the Middle Ages; so when in the recent rupture between Norway and Sweden, young Prince Karl of Denmark was asked by the Storthing to assume the Norwegian crown he adopted the ancient name and became King Haakon VII. He is the son of Frederick VIII of Denmark; his wife, formerly Princess Maud Alexandra of England, is the youngest daughter of the late King Edward VII. The choice of the Storthing was later ratified at a popular election. The young king was educated in the public schools of Denmark, and at the Danish Naval Academy. He served for a time as an officer in the national navy. This devotion of his to the sea has done much to endear him to the hearts of his people, descended as they are from the Vikings of old. See NORWAY.

Haarlem, a city of the Netherlands. It is situated eleven miles west of Amsterdam. It is only five miles from the North Sea. Its population in 1910 was 70,289. It has large cotton and linen factories, breweries, and type foundries. During the Middle Ages it was a town of considerable commercial importance. The old town hall is noted for carvings. The Great Church is one of the largest in Holland. It is noted for a tower 260 feet in height, and has a large organ. There are several collections of antiquities and of medieval art. The name was brought to New Amsterdam by the Dutch settlers of that province, where it is still preserved in Harlem Heights and the Harlem River. The vicinity of Haarlem is devoted largely to the cultivation of flowering bulbs and tubers. Tulips, dahlias, lilies, and other plants are raised in great numbers. The Haarlem flower shows attract florists and flower lovers from all parts of Europe. See NETHERLANDS.

Habeas Corpus, hā'bē-ăs kôr'pŭs, a writ issued by a judge ordering a prisoner to be brought into court in order that the cause of his detention may be inquired into. The writ is addressed to the constable, sheriff, or marshal having the prisoner in custody. The court, that is to say, the judge, inquires into the charge on which the prisoner is held, and issues an order sending him back to jail, admitting him to bail, or setting him free, as may seem proper. The writ of habeas corpus is an ancient right of the English people. To make sure, it was inserted in Magna Charta, assented to by King John in 1215 at Runnymede. King's courts and officers having long made it a dead-letter, it was repassed in 1675, with more effectual safe-guards against its violation. It is intended to prevent imprisonment on false or malicious charges. The desired writ may be applied for by an attorney or by any friend of the prisoner. The English colonists in America brought with them this priceless privilege as part of their common-law inheritance; and the Constitution of the United States provides that the privileges of the writ of habeas corpus shall not be suspended unless, in case of actual rebellion and invasion, the public safety may require it. In order to avoid conflicts of authority it has been decided by the United States supreme court that the court of a state may not issue a writ of habeas corpus for a prisoner held in federal custody. The resort in such cases must be to a federal court. The necessity of provision like that of the habeas corpus may be understood the more readily when we recall that in France prisoners of state were confined in the Bastille for years, or even for life. Their friends had no possible way of bringing them into court in order that the causes of their detention, however unjust, might be inquired into. See CHARLES II; MAGNA CHARTA.

Habit, the tendency of a thing to do or be what it has done or been. In the case of man the thing is his body, particularly the nervous structures of his body. Brain, spinal cord, and nerves branching from these nerve centers are under the law of habit. They must do or be what they have done or been. Each response the body is permitted to make involves changes in these

nerves and nerve centers. Gradually the body comes to be a complex nerve-muscle machine responding to stimuli in certain definite ways because such responses have been made before. All things must form habits; living things form more habits than those without life. The more complex the animal in its life and bodily structure, the more habits it must form. Man must acquire more varied habits than any other animal.

Whenever man faces a situation to which he has not before responded, he has a chance to begin the formation of a new habit. The new situation might be a bicycle. The boy desires to ride. He has many habits of movement but none that exactly fit this situation. At first he cannot balance; he makes too many movements; excessive expenditure of energy is characteristic of the beginning of every habit. Finally the boy catches his balance and propels the machine at the same time. In the beginning of nearly every habit the first successful performance is largely accidental. But memory helps here; the boy remembers how he succeeded. He repeats the performance. Repetition eliminates the unnecessary movements, coördinates those needed and permits attention to be withdrawn from the process. The boy is soon able to mount the bicycle and dart off without close attention to what he is doing.

This is the beauty as well as the tragedy of habit; the performance is likely to recur in response to the appropriate stimulating conditions with little or no demand upon attention. Many a good resolution to reform has been overthrown because the body responded before thought could intervene. To break a habit, then, one must do more than make resolutions; he must keep away from the stimulus or situation which has prompted that response, and he will do well to try to reach his lower nerve centers by appropriate self-suggestion.

Habit is the great conservative force in society. Men dislike change because it means breaking up old habits and forming many new ones. Like the boy with his bicycle, the initial stages may be distinctly unpleasant. The poor man of the city lives his wretched life in the slums because habit makes it easier than facing new conditions in the country; the miner would find farming irksome. Men soon begin to feel that they are too old to change. For this there is a good reason; nervous tissues are more plastic in youth, hence that is the habit-forming period. During childhood correct habits of movement, personal cleanliness, and speech should be acquired. Before the age of twenty, habits of honesty and industry need to be well fixed, and by twenty-five the special habits demanded in one's life-work should be quite thoroughly mastered.

Hackberry, a genus of trees related to the elm, called also the nettle tree, sugar berry and hoop ash. One large species, perhaps the best known, is found quite generally throughout the western United States. The tree is symmetrical, sometimes of great height and beauty, with a rough bark and a hard, woody berry. The wood is tough and when young is used for barrel hoops, to which fact the tree owes one of its popular names. The leaves are heart-shaped, parallel-veined and short-petioled.

Hackling. See CARDING.

Haeckel, hĕk′ĕl, **Ernst Heinrich** (1834-1919), a noted German naturalist born at Potsdam. He studied at the universities of Würzburg, Berlin, and Vienna, devoting himself particularly to medicine and the natural sciences. His researches upon the simplest forms of marine animal life gave him the material from which he drew his important conclusions. In 1865 he accepted a chair of zoölogy at the University of Jena. Enthusiastic and aggressive in his conception of man's origin through evolution from lower animal forms, his name has become inseparably connected with those of Huxley and Darwin. In 1866 he produced his masterwork, *The General Morphology of Organisms,* an exposition of the doctrine of evolution, which has done more than any other book to popularize Darwinism in Germany. Two years later the *Natural History of Creation* appeared and was later translated into twelve languages. This was the first attempt to apply the general principle of development to the whole field of morphology and establish a classification of animals and plants based on the

doctrine of common relationship. He assumed that the gastrula stage in the development of animals is a recapitulation of a hypothetical common ancestor which he termed the Gastraea. This Gastraea theory is his contribution to the general theory of evolution and through his work as a popular scientific writer and lecturer, his influence has been felt throughout Europe in spreading the knowledge of the principles of Darwinism. To support his views he wrote the *Last Link* and *The Riddle of the Universe*. Important among his other works are *Confessions of Faith of a Man of Science, Origin and Development of Animal Tissues, A Visit to Ceylon, etc.*

Haddock, a food fish related to the cod. Ordinary haddocks weigh two pounds and upward to ten. Great shoals are found in the North Atlantic. Haddocks are a favorite fresh fish in the markets of the large cities. Boston is well supplied from Massachusetts Bay. The smoked haddocks of northern Scotland are the "Finnan Haddies" of commerce. See COD.

Hades, hā′dēz, in Greek mythology, the god of the lower world. He ruled over all the other powers of the infernal regions and over the shades of the departed. Since the ancients located the dwelling of the dead in the bowels of the earth they came to assign to Hades the control of all the wealth of earth, including the products of mines as well as corn and other fruits of the soil. Then, because they dreaded to utter the name which called up the fearful images of death and darkness, they called Hades, Pluto, "giver of riches." Hades was the son of Cronos and Rhea, brother of Zeus and Poseidon. His wife was Persephone, and the two reigned in a splendid palace. Hades was supposed to bear a staff with which he drove souls to the lower world. He possessed a helmet which had the power of rendering its wearer invisible, and which both gods and men found occasion to borrow. In works of art, Hades resembles Zeus and Poseidon, but his face is dark and gloomy, with the hair falling over the forehead. He holds the key of the infernal regions, and the dog Cerberus is by his side. Sometimes he is crowned with maiden-hair fern, which plant was sacred to him, as were the cypress and narcissus. Ordinarily prayers to him were considered of no avail. In rare circumstances mortals invoked him, when black sheep were sacrificed and the attention of the god was called by striking upon the earth with the hand. The Romans identified Hades or Pluto with their Dis and Orcus. See ZEUS; POSEIDON; MYTHOLOGY; DEMETER.

Hades, in Greek mythology, the lower world in which the spirits of the dead dwelt. It received its name, Hades, from the god who ruled these regions. According to the most ancient writers, there was no separation of the just from the unjust in Hades. All spirits appeared to retain the outer form and to pursue instinctively the favorite occupation of their earthly life, but without interest. They had neither animation nor emotion, but were indeed only shades of their former selves. Later writers describe the souls as separated according to merits. The righteous dwell in Elysium and lead a painless, if not a positively happy existence, wandering in meadows where grow the pale flowers of the asphodel. The wicked endure various torments in Tartarus. In the Odyssey, the entrance to Hades is west of the river Oceanus; that is, at the end of the world where the sun drops into darkness. As western regions became better known, the entrance to Hades was located in various places, a writer selecting usually some gloomy cavern, perhaps in a volcanic region, as an appropriate place for shades to leave the light of day. The god Hades was represented as conducting them thither, although later writers assigned this task to Hermes. Perhaps the most interesting feature in the ancient account of Hades is the description of the five rivers, Styx, Acheron, Cocytus, Phlegethon, and Lethe. The first three of these names are ancient geographical appellations for real streams, each of which possessed some peculiarity of a nature to foster superstition or inspire awe. The waters of the Styx, in Arcadia, were bitter and fell from a lofty precipice amid wild and desolate scenery. The waterfall is still regarded with superstition. The people of the region believe the water to be noxious and call it the Black Water or the Terrible Water.

Some critics claim that the Arcadian waterfall was not called Styx in prehistoric times, but received its name from the infernal river, which, in turn, was named for an Egyptian river Styx. Cocytus was the ancient name of a small stream in Epirus, now called the Vuvos, the waters of which are ungrateful to the taste. It flows for some distance underground and joins the Gurla, which is the modern name of a river formerly called the Acheron. This river flows, for a part of its course, between mountains whose precipitous sides rise for 3,000 feet above the bed of the stream.

Thesprotia, the ancient name of that part of Epirus through which the Acheron flows, was believed to be the end of the world to the west. It is probable that some ancient writer, possibly Homer, boldly gave these names, already full of meaning to the weird fancy of a superstitious people, to the rivers by which he imagined Hades to be encircled. According to these accounts, the Styx flows seven times around the infernal regions. The Cocytus unites with it, and their waters then flow into the Acheron, which is represented as forming a lake. The Phlegethon or Pyriphlegethon is a river of flame. It flows in a direction opposite to that of the Cocytus, but like it, joins the Acheron. Charon, the ferryman, in his crazy boat carries the shades across the Acheron, the Cocytus, and the Styx. The fifth river of Hades is the Lethe. Is is the river of forgetfulness. Other names given to Hades by the Greeks and Romans are Tartarus, Dis, Orcus, and Erebus. The rivers of Hades are thus described by Milton in *Paradise Lost:*

> Of four infernal rivers, that disgorge
> Into the burning lake their baleful streams—
> Abhorred Styx, the flood of deadly hate;
> Sad Acheron, of sorrow black and deep;
> Cocytus, named of lamentation loud,
> Heard on the rueful stream; fierce Phlegethon,
> Whose waves of torrent fire inflame with rage.

See CERBERUS; STYX; COCYTUS; ACHERON; PHLEGETHON; CHARON; LETHE.

Hadley, Arthur Twining (1856-), an American economist and college president. He was born at New Haven, Connecticut, the son of James Hadley, the linguist. His college years were spent at Yale University of which he was later to become president. and he then studied for two years in the University of Berlin where he devoted himself to history, economics and political science. Upon his return to the United States he became tutor and lecturer at Yale, and later professor of political science. From this position he was elected to the presidency of the university in 1899, retaining that position until 1921, when he resigned and since when he has been president emeritus. Dr. Hadley is the author of several books, among them being *Railroad Transportation—Its History and Laws, Some Influences in Modern Philosophic Thought* and *The Moral Basis of Democracy.*

Hadrian, hā′drĭ-an, a Roman emperor. He was a nephew of Trajan, whom he succeeded. He reigned 117-138. He was a prudent man. He made numerous tours of inspection, strengthening the defenses and reorganizing the government of the provinces. He drew in the eastern boundary of the empire to the Euphrates. He is credited with originating Hadrian's Wall, or the Picts' Wall, as it is sometimes called. It was a combination of walls, earthworks, camps, roads, and stations, leading across Scotland from the mouth of the Tyne to the Solway. It lies farther south than Agricola's Wall, and, so far as may be judged from the ruins, was a work of military value. As seen from the north, it consisted first of a stone wall eight feet broad and twenty feet high, with turreted gates at intervals of a mile and numerous towers for the use of guards. One hundred twenty yards to the south of the stone wall, but parallel to it, stretched a double earthen rampart and ditch. Between the wall and the rampart ran a broad military road of perfect construction, in which fourteen fortified camps were located at intervals of about five miles. Hadrian was a famous builder. He founded the city of Adrianople, near Constantinople, and named it for himself. He built a large triumphal arch in Athens. At Rome he erected a magnificent mausoleum beyond the Tiber and constructed a new bridge leading to it. It is a huge circular tower 203 feet in diameter. It is now known as the castle of Sant' Angelo. Hadrian's Villa, near

Rome, included a theater, a race course, booths, temples, an imperial palace, barracks, officers' quarters, and many other public buildings. The place was adorned with statuary, and was, no doubt, the most artistic spot in Italy.

Hagenbach, Carl. See HAMBURG.

Hagerstown, Md., the county seat of Washington County, is an important manufacturing city situated on Antietam Creek and on four railroads, 86 miles west-northwest of Baltimore. This city, settled under the name of Elizabethtown, was an important base of operations during the Civil War. Close by are the battlefields of Antietam and Gettysburg. The principal manufactures are pipe organs, steam engines, bicycles, flour, lumber, silk, boilers and fertilizer. It has two high schools, one for girls and one for boys, the Washington County Free Library and modern graded schools. Population, in 1920, 28,064.

Haggard, Henry Rider (1856-), an English novelist. He was educated for the law, but has devoted his time to literature and agriculture. *She, The Witch's Head, Jess, King Solomon's Mines, Allan Quatermain, Beatrice,* and *Montezuma's Daughter,* are the best known among his novels. They are highly imaginative romances and full of exciting incidents, but are of no literary merit other than an easy and natural style.

Hague, The, an important city of the Netherlands. It lies three miles from the North Sea. It is in line with Delft, Leyden, and Haarlem. It is about sixteen miles from Rotterdam and thirty-three from Amsterdam. It bears much the same relation to the latter city that Versailles does to Paris. Amsterdam is nominally the capital, but the queen resides at the Hague. The foreign ambassadors have their residences here. The States General, the congress of the Netherlands, has its hall of assembly in the Binnenhof, a large, irregular government building. The Hague is a city of palaces and government buildings. A town hall and a royal library containing 300,000 volumes, a municipal museum of pictures and antiquities, and a royal gallery of Dutch paintings, are of interest to visitors and students. The Hague, in size the third city of the Netherlands, in 1909 had a population of 270,109. The prevailing religion is that of the Reformed Church, a form of Presbyterianism. See HAGUE TRIBUNAL.

Hague Tribunal, The, an international arbitration commission. In response to an invitation from the Czar of Russia, an international peace congress met at the Hague in 1899. The congress made three suggestions: First, the establishment of a tribunal for the settlement of international disputes; secondly, the enactment of certain rules and regulations for the conduct of war on land; and third, the adoption of rules forbidding the throwing of projectiles and explosives from balloons and the use of soft bullets. The proposals of the congress met with the approval of the governments of Austria-Hungary, Belgium, Bulgaria, Great Britain, Denmark, France, Germany, Italy, Netherlands, Persia, Roumania, Russia, Siam, Spain, and the United States. The arbitration tribunal was accordingly established. Andrew Carnegie gave $1,500,000 to provide a suitable building. The Peace Palace at The Hague was erected. Previous to the World War the tribunal adjusted a number of international disputes. The International Court of Arbitration provided by this tribunal in no wise conflicts with the Court of International Justice (which see). The former settles cases of a diplomatic nature; the latter, cases in which points of international law are involved. See COURT OF INTERNATIONAL JUSTICE.

Hahnel, Ernst (1811-91), a German sculptor, was born at Dresden. He studied architecture there and at Munich. Later he received commissions for friezes for the Royal Theatre of Dresden. The most important of these is the *Bacchanalian Procession,* which was destroyed by fire, but of which a plaster cast was preserved. His works are many, and include a bronze statue of Beethoven, an enormous statue of Charles IV at Prague, the bronze of Frederick Augustus II at Dresden, five ideal statues representing *Eve Protecting Abel from Cain,* and the two remarkable *Pegasus* groups.

Hahnemann, hä′neh-män, **Samuel** (1755-1843), a German physician, the founder of homeopathy. He was born at Meissen, Saxony, in which city his father was a skillful decorator of the sort of china known as Dresden ware. It was intended that the boy should follow his father's calling, but he took to the profession of medicine. He studied at Leipsic, where he supported himself by translating medical works. He was familiar with Latin, Greek, the chief modern languages of Europe, and with Arabic as well. A translation from English into German of Cullen's *Materia Medica,* a description of the drugs then known, appears to have been the turning point in his life. His attention was arrested by the article on quinine. He experimented on himself, finding that a dose of quinine produced symptoms of ague, for which that drug is a sovereign remedy. Experiments with other drugs led him to the conclusion that medicine cures diseases by producing symptoms similar to those of the disease itself, that is to say, by exciting a mild form of the disease itself. Expressed in Latin, this principle runs, *"Similia similibus curantur."* The corresponding English expression is "Like cures like." He published a *Materia Medica* of his own, and a number of works describing his system of medicine. In 1820 he was forbidden ever to teach, publish, or practice. In 1855, on the centennial anniversary of his birth, a monument was erected to his memory at Leipsic, the scene of his former triumphs and humiliations.

The name suggested by him for his system of remedies was homeopathy, a Greek word meaning likeness of condition or feeling. His adherents and followers have spread over the civilized world. They maintain a large number of medical colleges and form a considerable body of practitioners. In the public mind, homeopathy is associated with the giving of drugs in infinitesimal quantities. The school is popularly credited with having influenced the so-called regular or allopathic physicians to use drugs less freely.

See MEDICINE; DISEASE.

Hail, pellets of ice falling in showers. A hailstone consists usually of a core of hard snow at the center, surrounded by successive shells or layers of ice and snow. At times, the pellets have a radial structure, that is to say, they consist of rays extending from the center. Hailstones are of all sizes, from pellets so small as to be hardly perceptible up to unusual diameters of from three to four inches. Hailstones having weight of half a pound are on record. Inasmuch as the formation of hail takes place in the upper air, the manner of formation is more or less a matter of conjecture. It is believed, however, that raindrops are driven by currents of wind into a higher, colder region, where they are frozen. Then descending into a warmer layer, they gather moisture and are driven up again to freeze as before. In this way successive layers of ice and snow are formed. Amid its buffetings up and down and to and fro the hailstone is permitted to fall to the earth. Hailstorms occur usually toward the close of the day. They are destructive of crops. Not infrequently after a storm, hailstones lie to the depth of an inch or two on the surface of the ground. The vine growers of France suffer tremendous losses from frequent hailstorms. A theory has been advanced that a hailstorm may be broken up, if taken early, by firing cannon into the center of the cloud. Considerable sums of money have been spent by the French government and by private owners in experimenting. Charged cannon stand in vineyards ready for instant use on the approach of a cloud. It is claimed that excellent results have been obtained, and that vineyards have been saved, while others in the immediate vicinity, not thus protected, have suffered severely, but a continuation of the experiments did not substantiate these claims. In those regions in the United States where hail storms are likely to occur, farmers usually purchase hail insurance.

See DEW; FROST; RAIN; SNOW, WEATHER BUREAU.

Haig, Sir Douglas, (1861——), commander-in-chief of the British military forces in France and Belgium from 1915 to the close of the Great War. He entered the army at the age of twenty-four and served in India and Africa, rising steadily in rank. In 1912, he was made commander at Aldershot, the principal training camp

of the British army. On the outbreak of the Great War he was raised to the rank of general and made commander of the first army corps that went to France, and December, 1915, succeeded Sir John French as commander-in-chief. He was considered one of the ablest commanders during the war, and the most brilliant successes of the British troops were under his leadership. In 1917, he was given the rank of field marshall, the highest rank in the British military service. See WAR, THE GREAT.

Hail Columbia, a popular American patriotic song. The air dates back to Washington's day; it was played as a march while he rode to his first inauguration. The origin of the music is disputed, but the words, much modified today, were fitted to it by Judge Hopkinson in John Adams' administration.

Hair, the peculiar covering of the body of animals that suckle the young. At some period in their lives all mammals, even whales, have hair. Each hair is an outgrowth of a certain layer of the epidermis. A hair may be regarded as a sprout from the epidermis. The nearest approach to a hair is a feather, but feathers grow from the outer skin or derma. Hair takes many special shapes. The hoofs of quadrupeds are locks of hair adhering together by means of glue. The horn of the rhinoceros, the ox, the sheep, in short, all true horns are, like a hoof, modified tresses of hair and glue. The hair of the pangolin, a long-tailed anteater of Malay, assumes the form of scales, much like those of a crocodile. Fur-bearing animals are covered with dense, fine hair. Some animals are almost naked. The elephant has very scanty hair. In the case of the hedgehog and porcupine, certain hairs are enlarged and have the form of quills.

No two kinds of animals have hair alike. An expert is able to tell the difference readily. The difference between straight and curly hair is due to a difference in shape. Straight hair is cylindrical and has circular cross sections. Wavy or curly hair is flattened and has an oval cross section. The flatter the hair, the more curly it is. The hair of the sheep, that is to say, wool, as well as the hair of the beaver and certain other animals, is roughened with little scaly projections that point toward the tip and enable it to felt. All hair is composed of substantially the same material. Difference in color is due to the presence of different pigments. Human hair varies in diameter. Blonde hair is the finest; red hair the coarsest. A blonde hair is about $\frac{1}{600}$ part of an inch in diameter. Red hair runs 250 to the inch. A blonde head may carry 140,000 hairs; a red head possibly not over 90,000.

Many animals, as the horse, the ox, and the fur bearers, shed their hair with regularity. The old coat is followed by a new. The long hair of the mane and tail of the horse and the tail of the ox remain unshed. In the case of man hair grows about seven inches a year, but once lost it is not apt to be restored. Each hair is nourished at its base, where new cells form, pushing the older portion farther out. Oil glands keep it moist. Certain hairs, such as the whiskers of a cat, mink, or a tiger, are reached by delicate nerves, making them serviceable as feelers.

See SHEEP; FUR; HORN; HAT; FELTING; etc.

Hair Cloth, a fabric woven with a cotton or linen warp and a filling of hair from the manes and tails of horses. It is elastic and wiry, and is not affected by damp weather. This makes it of especial value as an interlining in such parts of clothing as need stiffening. Most fabrics in use for such purposes are made stiff, in part at least, by the finishing process, and become soft by wear. Hair cloth retains its original qualities permanently. Hair cloth is woven with difficulty on account of the shortness of the hairs. Formerly an assistant must select the hairs, one by one, and pass them to the weaver. An automatic attachment is now in use. Instead of the shuttle, which carries the weft thread in the ordinary loom, an iron bar with a tiny gripper at one end passes over and under the warp threads, seizes a hair from the bunch at the side of the warp, and draws it into place. Hair cloth was at one time popular for covering furniture, as chairs, sofas, etc.

Hairdressing. As far back as we have any record, hairdressing has been one of the chief means of personal adornment.

Often certain modes of dressing the hair have signified a particular rank, dignity, age, a deed of special bravery, and the like. Even today a Zulu warrior stiffens the hair around the circumference of his head so that it forms a very noticeable coronet. Priests of the Roman Catholic church have a particular tonsure, quite different from that worn in the Greek church. Six centuries before Christ the Greeks, both men and women, wore most elaborate head-dress, as did the early Egyptians. A century or so later Greek men began to cut their hair short, and from that time on, except for intervals when they wore wigs, men in general have paid little attention to the hair. Not so women. Their coiffures have gone through every possible variety of elaboration with only occasional intervals of sanity. In the reign of Louis XVI of France a strange structure of pillows and crinoline formed the foundation for a great tower surmounted by a little cap of feathers or flowers quite removed from the head. One woman is said to have gone about topped with a tiny model of a ship.

Haiti, hā′tĭ, an island of the West Indies. It lies between Cuba and Porto Rico. It is second in size to Cuba. It is about 400 miles in length. Its greatest width is 160 miles. The area is about 28,000 square miles, about that of Ireland or South Carolina. The center is rugged and mountainous. Several peaks exceed 8,000 feet in height. The highest attains an altitude of 10,300 feet. In the low lying, sheltered regions, the heat is too intense for Europeans. At an altitude of 1,600 feet and upward, the nights are cool and the climate delightful. The forests are of luxuriant growth, but are as yet too inaccessible to be of much use. Cedar, mahogany, lignum vitae, logwood, and fustic are the more valuable woods. The coasts, the valleys, and the plains lying amid the mountains are unusually fertile. Sugar-cane, tobacco, cocoa, bananas, sisal, and cotton thrive. Coffee is raised in the mountains. In addition to the articles mentioned, the list of exports includes honey, deer horns, tortoise shells, moss, molasses, rum, and sole leather, as well as various kinds of timber.

The island was discovered by Columbus, December 6, 1492. He founded a settlement near the present city of Santo Domingo. At his death, he requested that his remains be buried here. They were deposited in a lead coffin in a cathedral of this city. The Spanish removed what were supposed to be his remains to the Cathedral of Seville, Spain. A controversy has arisen as to where the remains now actually rest. It is believed, on what seems excellent authority, that a casket, now at Santo Domingo, is the real one, and that the casket at Seville is that of a relative, possibly a son.

At all events, Santo Domingo was for over 300 years the capital of a more or less thriving colony. Early in the history of the island, the western portion was seized by French buccaneers, between whom and the Spanish warfare was kept up for a century or two. Both French and Spanish exterminated the Indians, numbering some 2,000,000, by forcing them to labor in mines and otherwise. Both ends of the island imported negro slaves. As the centuries crept by, it came about that the eastern end of the island was peopled by a mixed race of Spaniards, mulattoes, and native Indians, dominated by people of pure Spanish blood. The western end in like manner acquired a population of mixed French, negroes, and native blood. After numerous uprisings and countless revolutions portions of the island attained their independence. They were for a time united under one government. The eastern or Spanish portion of the island now forms the Republic of Santo Domingo, or the Dominican Republic, as it is sometimes called. The western or French end is known as the Republic of Haiti. The prevailing religion all over the island is Catholic. Naturally we should expect to see Haiti under one government, but the prevailing language of the east is Spanish; and that of the west, French. It has thus far been impossible for the two little republics to harmonize under one government. During the administration of President Grant a treaty was negotiated for taking over the control of the Spanish end of the island, but it was defeated in the United States Senate. The history of the country has been one revolution after another. In

In 1915 the United States, in response to an appeal of the Haitians, intervened and virtually took charge of the Haitian Republic. Under American management conditions rapidly improved. However, in 1920 several complaints against American rule were made by Haitian native officials, and a congressional committee went to Haiti and investigated the complaints. The report of the committee sustained the United States officials, who are trying to educate the people to rule themselves. See SAN DOMINGO.

STATISTICS. The following are the latest reliable statistics to be had:

Area, square miles	10,204
Population (estimated)	2,500,000
Chief Cities:	
Port-au-Prince	120,000
Jacmel	20,000
Cayes	15,000
Members of senate	15
Members of chamber of deputies	40
Salary of President	24,000
National revenue	$ 5,608,000
Imports	$27,398,411
Exports	$18,990,032
Miles of railway	104
Pupils in public schools	44,322

Hake, a valuable food fish belonging to the cod family. The American fisherman recognizes three species, the silver hake, or whiting; the white hake; and the squirrel hake. The last two are known also as codling and ling. Other species are found in the Pacific. Hake fishermen save the air bladders for isinglass. See COD.

Hakluyt, hăk'loot, **Richard** (1552-1616), an English geographer. Little is known of his early life. The date of his birth is uncertain. He studied at Oxford and was admitted to the priesthood. In 1583 he was a member of the English embassy at Paris. In 1589 he published an extensive collection of travels, entitled *The Principal Navigations, Sea Voyages, and Discoveries of the English Nation.* In 1598 he prepared a greatly enlarged edition in three volumes. He aimed in this collection to give a complete account of the earth's surface as reported by discoveries. His compilation is, therefore, invaluable. Writers of American history go to it for an account of the Cabots, Drake, and other navigators. He took an active interest in the colonization of Virginia. The Hakluyt Society of London, named in his honor, was established in 1846, with the purpose of printing rare works of geography. Its publications have been of the greatest service to those interested in the history of geography. Besides his published writings, Hakluyt left a large collection of manuscripts.

Halcyon, hăl'sĭ-ŏn, an old and poetical name of the kingfisher from Halcyone, the wife of Ceyx, king of Thessaly. When Ceyx was drowned in a storm at sea, the gods in pity for the lonely Halcyone, changed the two into kingfishers. There was a tradition among sailors that the halcyon laid its eggs in nests floating on the sea about the time of the winter solstice. In order that its nest might ride safely the bird was reputed to have the power of charming the wind and waves during this period. The calm weather usually found at this season was attributed, therefore, to the halcyon, whence the name. Even on land, pleasant mid-winter weather came to be known as halcyon days. It seems strange that the legend should not have attached itself to some gull, petrel, or albatross, rather than to the shore-loving kingfisher. See KINGFISHER.

Hale, Dr. Edward Everett (1822-1909), an American Unitarian clergyman and writer of note. He was a grandnephew of Nathan Hale, the patriot, and a son of Nathan Hale, journalist and editor. Dr. Hale was born in Boston and received his education at Harvard. In 1842 he became pastor of a church in Worcester, Massachusetts. He remained here for fourteen years, when he accepted a position as pastor of the South Congregational Society of Boston—a Unitarian church. He was with this church, either as an active minister or as pastor emeritus, during the remainder of his life. In 1904 he became chaplain of the Senate, a position he held until his death.

Dr. Hale accomplished an immense amount of work in his long life. He was pastor, preacher, philanthropist, reformer, editor, lecturer, and the author of so many writings that they have been called "appallingly voluminous." His story, *Ten Times One is Ten,* led to the organization of the "Lend-a-Hand Society." This organiza-

tion is widespread throughout the United States, and has numerous branches in Europe, Asia, Africa, and the islands of the Pacific. Dr. Hale organized also the "Look-up Legion," a society for Sunday School children with the motto,

To look up and not down,
To look forward and not back,
To look out and not in, and
To lend a hand.

Perhaps the best known of all his writings is the story, *The Man Without a Country.* It is regarded as one of the most perfect short stories ever written. Other writings are, *Philip Nolan's Friends, Boys' Heroes, The Story of Massachusetts, A New England Boyhood, Lowell and His Friends, Margaret Percival in America, If, Yes, and Perhaps, In His Name.*

SAID OF HALE.

The Grand Old Man of Boston.

He is in hearty sympathy with whatever contributes to the happiness of humanity. His best strokes of invention have their impulse in his devotion to the welfare of his fellow man.—Shaw.

No other American writer has equaled him in this ability to make history out of fiction.—Abernethy.

Boston's first citizen is gone; there is no successor in sight—no one, at least, combining so many talents, so much distinction. There is no one whose work has been so varied, so fruitful, so rich in the grace and sweetness of which American life is so lamentably poor.

Hale, Nathan (1755-1776), an American patriot. He was a native of Coventry, Connecticut. He was graduated at Yale, shortly before the outbreak of the Revolution. He was a captain in the patriot army. He was sent by General Washington to bring intelligence of the British in New York City. He was captured within the British lines, and, though Washington made every effort to save him, was executed as a spy by order of Sir William Howe. His last words were, "I only regret that I have but one life to lose for my country." His sad fate was remembered later when André was in the hands of the Americans. In 1893 a statue was erected to Hale's memory in New York. See ANDRÉ.

Half Moon, the ship in which Henry Hudson sailed up the Hudson River in 1609. It was a small wooden ship with high poop and stern. It was a sailing ship, helpless in a calm. A reproduction of the Half Moon took part in the Hudson-Fulton pageant at New York in 1909.

Half-tone, a picture printed from a plate produced by the half-tone process of engraving; the term is also applied to the plate itself. The half-tone process is a phototypographic method in which, in the process of photographing the object, a screen of netting, or a ruled glass, is interposed between the lens and the sensitized plate. When a glass screen is used, it is ruled with fine lines crossing one another at right angles, and is inserted in the camera about one-sixteenth of an inch from the plate on which the negative is being made. The lines run from 100 to 250 per square inch. From the negative thus made, a positive image is produced upon a prepared metal plate and etched into relief by acids. The screen is designed to give to the etching a texture similar to that produced by the hand engraver. A common defect of its use is an undue softening of both lights and shadows, with loss of distinctness, but this may be largely remedied by the expert photo-engraver. In most pictures reproduced by the half-tone process, the screen effect can be observed on close scrutiny. The coarser screens are used when the plates are to be used in printing on ordinary paper, such as newsprint; finer screens are employed when the pictures are to be reproduced on the better grades of smooth-surfaced, supercalendered, or coated, paper.

The idea of subdividing an image into a series of dots and prepare a printing plate in this manner was first broached to engravers by Fox Talbot about 1852, after the discovery that bichromate of potash decomposed under the influence of light when it came in contact with organic matter. Talbot utilized this discovery in his process, but the modern process of half-tone engraving awaited the further discovery of mechanical means for making a perfect screen by ruling lines of extreme fineness and perfect uniformity of width at distances absolutely equal from one another. This did not come about until comparatively recent years, but plates of glass

can now be ruled in this way with lines that run 200 or even 400 to the inch. The half-tone screen now used consists usually of two such plates of glass, placed together so that the lines cross one another, and break up the image photographed into minute square or diamond-shaped dots on the negative when the screen is placed in front of the plate. A double glass screen of this kind was first used in Philadelphia about 1885; and in 1893 a process of ruling and etching the lines in glass plates and filling in the interstices with black pigment was patented. When united with the lines diagonal to one another, two ruled plates of glass are cemented together to form the modern screen.

In making a half-tone, from the negative, with its dots of varying intensity according to the lights and shadows of the original image, it is placed in contact with a copper plate coated with a preparation of bichromate of ammonia, fish glue, albumen and water. On being exposed to the light and washed with water, the parts protected from the light by the dense portions of the negative will be washed out of the half-tones in due proportion. The plate is then "burnt in" by heating over a gas stove, and is finished by etching with acid.

Color printing from photo-engraved surfaces may be accomplished by means of what are known as the three-color and four-color half-tone processes. The three-color process is most used. This is a method of engraving in relief by photography, and etching upon three separate metal plates or printing-surfaces of yellow, red and blue, which are successively superimposed in printing on a typographic press, to produce the many needed combinations of color required for a truthful picture. Successful workmanship depends on the ability of the photographer to detect and practically dissect the primary colors of a pictorial design, and on the skill of the hand engraver who may seek to improve the effect by varying the cross lines on the plates to make neater combinations of color. Successful printing from three-color half-tone plates also depends on the purity of the primary colors and accuracy of register, that is, accuracy in superimposing the second and third color plates on the previous prints, so as to get the combinations of color in exactly the right place. In the four-color process, an additional color plate, which prints black or some other dark color to add distinctness to the final reproduction of the picture, is used.

Half-tones, plain and in color, have added immensely to the art of illustration, and have given us the illustrated newspaper and the modern magazine with its wealth of illustrative art. The special advantage of the half-tone plate is that it can be printed along with type in any ordinary press or printing process.

Haliburton, Thomas Chandler (1796-1865), a Canadian historian and humorist who as the creator of *Sam Slick* won an international reputation and probably founded the American school of humor. He was born at Windsor, Nova Scotia, and educated there at King's College. Mr. Haliburton was admitted to the bar in 1820, and in 1842 was raised to the Supreme Court of Nova Scotia. In 1835 he contributed to a Halifax newspaper a series of letters purporting to come from Samuel Slick, clock peddler. They were packed with ingenuous wit, sparkling aphorisms and genial sarcasm. Mr. Haliburton collected and enlarged the letters in 1837, and they became very popular as soon as published. He retired from the bench in 1856 and removed to England. Two more Sam Slick books appeared, however, before Mr. Haliburton left America. In one of them Sam Slick is represented as an attaché of the American embassy at the court of St. James. Other works by Mr. Haliburton are *Rule and Misrule of the English in America, An Historical and Statistical Account of Nova Scotia, Traits of American Humor* and *Nature and Human Nature.*

Halibut, a flatfish much esteemed for the table. For a general description of a flatfish, turn to article on TURBOT. The halibut is somewhat more elongated and is the largest of flatfishes. The halibut swims almost invariably left side up. Length, four to eight feet. Weight, fifty to six hun-

dred pounds. The halibut is common in the markets of North Atlantic cities. It is inferior to turbot in flavor, but has greater commercial importance. Smoked halibut is a staple article. The fishermen of the Orkneys and Greenland dry halibut for winter use and obtain large quantities of oil from it.

Halifax, Nova Scotia, a very important commercial and industrial city, is the county town of Halifax County and the capital of the province. The city is built on the east slope of a high peninsula in Halifax harbor, one of the finest harbors in the world. Halifax is the largest city in the Canadian Atlantic Provinces; it is 674 miles east of Quebec and 730 miles northwest of Boston. The crest of the peninsula upon which the city is built is 217 feet above the level of the sea.

Founded in 1749, Halifax grew rapidly. It is an especially important fortress and is the principal British North American naval base. It is served by nine railroads, among which are the Halifax & Eastern, Dominion Atlantic, Canadian Pacific, Intercolonial (of which Halifax is the terminus, now the Canadian National).

The Harbor. Halifax is the nearest to Europe of all North American ports. This fact alone would mean much to the trade life of the city, but it has the further advantage of possessing a deep, commodious harbor that is never locked by ice. Constant improvement has gone forward, and in 1922 the Dominion government was erecting new terminals to cost $30,000,000. The harbor has seventeen wharves for coasting and freighting vessels and twenty-two others for the accommodation of larger vessels. The depth of the water in the harbor varies from 29 to 46 feet. The port of Halifax is 616 miles nearer to Liverpool, England, than is the port of New York.

Industry and Commerce. Halifax is the trade center for Nova Scotia, handling great quantities of lumber, fish, fruit, hay, potatoes and various other products. The exports were valued at $34,414,298 in 1921. When the Saint Lawrence River is closed by ice, Halifax becomes the outlet for the trade of Montreal and Quebec.

The industrial life of Halifax is represented by a large steel shipbuilding yard and about one hundred factories. The largest sugar refining plant in Canada is situated here. Chief among the manufactured articles are foundry products, agricultural implements and machinery, musical instruments, paints, soap, candles, lubricating oil, mattresses, gunpowder, light and heavy machinery and brewery products. Industry is aided by an abundance of cheap hydro-electric power.

General Features. Halifax has for many years been a favorite summer resort, visited by thousands. Accommodation is afforded by the Waverly, Carleton, King Edward, Halifax, Queen and other fine hotels; there are numerous parks, public gardens and golf courses; and ample facilities for boating and bathing. There are forty-four churches in the city, which is the seat of the Anglican archbishop of Nova Scotia and the Roman Catholic archbishop of Halifax. There are many miles of well-paved, well-lighted and comfortably shaded streets. Of particular interest are the military barracks that overlook the harbor, government house, the Parliament building, city hall and custom house.

Education. The public school system of Halifax, comprising primary and secondary schools, is entirely modern, and is supplemented by a fine library. The city contains also two convents, the Nova Scotia Technical College, Dalhousie University, Saint Mary's College, schools for the deaf and the blind, the Halifax Ladies' College and Conservatory of Music and the Royal Naval College of Canada.

History. Halifax was founded to offset the influence of the French, who had a fortress at Louisburg, and was named for George Montagu, Earl of Halifax. While the modern city is ringed about by forts of the approved type, a part of the original stronghold remains. It played an important part in the Revolutionary War and the War of 1812. Until 1906 it was manned by troops from the British Isles, but since then the garrison has consisted of Canadians. In 1921 the population of Halifax was 58,372.

Hall, Asaph (1829-1907), an American astronomer who from being a carpenter advanced to the leadership of several astronomic expeditions, and is famous as the discoverer of two satellites of the planet Mars. He was born at Goshen Conn., and in 1854 attended Central College, McGrawville, N. Y., where he remained for more than a year, later attending the University of Michigan. Dr. Hall was appointed assistant to Professor Bond at Cambridge in 1857. In 1863 he was appointed professor of mathematics at the United States Naval Observatory, but left the government service in 1891. From 1895 to 1901 he was professor of astronomy at Harvard. The United States government placed Dr. Hall at the head of an astronomical expedition to Behring Strait in 1869, to Siberia in 1874, to Colorado in 1878 on a solar eclipse expedition, and to Texas. He discovered the satellites of Mars in 1877 and named them Deimos and Phobos. Dr. Hall made a valuable study of double stars. He received a gold medal from the Royal Astronomical Society in 1879, and in 1902 was made president of the American Association for the Advancement of Science. Our knowledge of the difficult satellite systems of Mars, Uranus, Saturn and Neptune is due almost entirely to his indefatigable researches, and owing to these he holds high rank among astronomers.

Hall, Granville Stanley (1846-), a well-known educator, psychologist, author, and editor. He was born at Ashfield, Massachusetts, and was president of Clark University, Worcester, Massachusetts. His higher education was begun at Williams College, where he received the degree of A. M. in 1870. He then spent a year in Union Theological Seminary, and in 1878, received his degree of Ph. D. from Harvard. This liberal education has been further broadened by several years of study at various German universities. For four years after leaving the theological seminary he was professor of philosophy at Antioch College, Ohio. Later he lectured in the department of English at Harvard, in the department of philosophy at Williams, and from 1881 to 1888 filled a chair of psychology and pedagogy in Johns Hopkins University. He left there to accept the presidency of Clark University, where he is also professor of psychology. In the work of organizing and directing the research work of his graduate students he has accomplished results remarkable in their scope and value to educational progress. His individual work has been to select problems for investigation and to unify and apply the results of such research until his mastery of these fields is unique. Through the employment of effort thus organized he has written several authoritative books on psychology in its relation to education, among them, *Adolescence and Its Psychology, Youth,* and *How to Teach Reading and What to Read in Schools,* as well as a book on *Aspects of German Culture.* He is the distinguished editor of *The American Journal of Psychology,* and *The Pedagogical Seminary.* See ADOLESCENCE; PSYCHOLOGY.

Hall of Fame, a memorial building at Munich, Bavaria. It was completed in 1853. It consists of a Doric portico with projecting wings on a high basement of masonry. At the center is a colossal statue of Bavaria in bronze, 62 feet high, representing a woman holding a wreath in her raised left hand, while the lion of Bavaria sits at her side. The portico contains eighty busts of celebrated Bavarians.

Hall of Fame, a memorial structure erected in New York City. A fund of $100,000 given to the New York University for the purpose, has been expended in building a colonnade five hundred feet long on University Heights in upper New York. The site is a magnificent one overlooking the fields of the Hudson and the Harlem. Panels to the number of 150, two feet by eight in dimensions, are to bear the names and the dates of birth and death of 150 famous native Americans. No one is eligible until at least ten years dead. The authorities submit names to a jury of one hundred members, themselves eminent men, representing all states of the Union. Any name receiving a majority vote and confirmed by the University senate is admitted to the Hall of Fame. In 1903 twenty-nine names were selected. They

received from ninety-seven to fifty-one votes each. Named in order they are:

Names.	
George Washington	Henry Clay
Abraham Lincoln	Nathaniel Hawthorne
Daniel Webster	George Peabody
Benjamin Franklin	Robert E. Lee
Ulysses S. Grant	Peter Cooper
John Marshall	Eli Whitney
Thomas Jefferson	John James Audubon
Ralph Waldo Emerson	Horace Mann
Henry Wadsworth Longfellow	Henry Ward Beecher
Robert Fulton	James Kent
Washington Irving	Joseph Story
Jonathan Edwards	John Adams
Samuel F. B. Morse	William Ellery Channing
David Glasgow Farragut	Gilbert Stuart
	Asa Gray

1905

James Russell Lowell	John Quincy Adams
John Greenleaf Whittier	James Madison
Mary Lyon	Louis Agassiz
Emma Willard	William T. Sherman
Maria Mitchell	John Paul Jones
	Alexander Hamilton

1910

Harriet Beecher Stowe	Phillips Brooks
Oliver Wendell Holmes	William Cullen Bryant
Edgar Allen Poe	Frances E. Willard
James Fenimore Cooper	Andrew Jackson
	George Bancroft
	John Lothrop Motley

1915

Mark Hopkins	
Francis Parkman	Charlotte Cushman
Elias Howe	Rufus Choate
Joseph Henry	Daniel Boone

1920

Patrick Henry	Alice Freeman Palmer
Mark Twain	Roger Williams
Augustus Saint-Gaudens	James Buchanan Eads
	William T. G. Morton

Hallam, Henry (1777-1859), an English historian. He was celebrated as a lawyer and was a Whig in politics, but delighted chiefly in writing. Two works, *A View of the State of Europe During the Middle Ages* and *A Constitutional History of England,* still have a dignified place in a historical library, but are out of date as authorities.

Halle, häl'le, a city of Prussian Saxony. It is situated on the Saale, twenty miles northwest of Leipsic. It is an old Hanse town. It possesses a university of great repute, founded in 1694. The University of Wittenberg was united with it in 1817. Many Americans have studied here. The old marketplace is the center of interest. A clock tower, a picturesque medieval city hall, a bronze statue of Handel, the musician, who was born here, a Gothic fountain, and the market people themselves are objects of interest. Halle is noted for the production of salt. Eleven thousand tons are made annually. The industry is in the hands of workmen known as Halloren. They are probably a remnant of the Wends who once inhabited this district. There are large starch, chemical, and beet sugar factories. In 1910 the population was 180,551. See FRANCKE.

Halleck, hăl'ĕk, **Fitz-Greene** (1790-1867), an American poet. He was born in Guilford, Connecticut. He was a descendant, through his mother, of John Eliot, the "Apostle to the Indians." He attended the village school at Guilford. While still almost a boy he went to New York City and found employment as a clerk in a counting house, where he worked for twenty years. He soon made the acquaintance of Joseph Rodman Drake. The two became warm friends and began writing a series of humorous sketches called *The Croakers* for the *New York Evening Post.* Halleck wrote about this time his longest poem, *Fanny.* It was published anonymously in 1819, and met with instant success. The poem is a satire on the fashion and follies of the time. It contained many local and personal allusions and enjoyed a short lived popularity. In 1820 Drake died. One of Halleck's best known and most perfect lyrics was written on this occasion. In 1832 Halleck entered the office of John Jacob Astor, in whose employ he remained until the latter's death in 1848. Astor left an annuity to Halleck, who now retired to Guilford, making his home with an unmarried sister. Halleck has left a volume of poems, the most noted of which is *Marco Bozzaris,* called forth by the war for Grecian Independence. School boys are familiar with the opening lines. See BOZZARIS, MARCOS; DRAKE, JOSEPH RODMAN.

Halleck, Henry Wager (1815-1872),

an American general. He was born in New York, and educated at West Point. His first service was in the Mexican War, in which he was made captain for gallant service. In 1854 he left the army and began the practice of law in San Francisco, but at the beginning of the Civil War he was commissioned major-general and was later made commander of the Department of the Missouri. The second year of the war he was given command of the entire Mississippi Valley, and he himself went into the field in charge of the army which operated against Corinth. A few months afterward he was made general-in-chief of all the Northern forces; he held this post until March, 1864, when he was succeeded by General Grant. He remained in the regular army after the war, having command of the military division of the South at his death.

Halley, Edmund (1656-1742), an English astronomer. He was born near London. His father was a wealthy soap boiler. Young Edmund was sent to St. Paul's School and to Queen's College, Oxford. He was a mathematical genius, nothing less. While a mere lad he noted the variation of the compass. At nineteen he computed the orbits of the planets. Becoming convinced that a more accurate determination of the position of the fixed stars was essential to progress in astronomy, he left the northern hemisphere to others already at work and prepared a catalogue of 360 stars visible in the southern hemisphere, thus winning the name of "Southern Tycho." He resided for a time at St. Helena, and noted that the London pendulum was too long for St. Helena; *i. e.*, that the standard pendulum loses time when it is carried toward the equator, and hence farther from the center of the earth.

Halley was acquainted with Newton and stimulated him to publish his *Principia*—a great work on astronomy. Halley held various official positions—director of the mint, professor of geometry at Oxford, and, to pass by others, astronomer royal at Greenwich. Interest in Halley was revived in 1909-10 by the return of Halley's Comet, named for him.

Halley became interested in computing the orbits of the comets that had appeared between the years 1480-1680. He discovered, what was not known previously, that comets follow regular orbits and return with regularity, and that the reason that a comet is not visible all the time is that, during the greater part of its orbit about the sun, it is too far away to be seen. The comet that now bears his name passed within 11,000,000 miles of the sun in 1682. Halley laid out its path; declared that it was the same comet that had caused consternation in 1607; and predicted its return in 1758. "And when it really appears," said he, "do not forget that it was an Englishman who made the first prediction of the return of any comet."

Halley died sixteen years before the time, but the comet came in sight on Christmas Day of the appointed year. It appeared again in 1835, and, as stated, in 1909. Halley's Comet is visible to the eye only a few weeks, and may be seen through the telescope for a few months only. It requires 78.8 years to complete a revolution in its orbit.

Hallowe'en, or **Hallow-Even,** the evening of October 31st, which precedes November 1st, known as the festival of All Saints. On this evening witches and all sorts of mischievous spirits are supposed to be abroad. It was considered formerly quite as safe not to be caught out alone on Hallowe'en; and even now it is considered good manners, at least, for elderly people to stay in doors. The belief in spirits abroad has faded out, yet the many pranks still played on this evening indicate that unusual agencies are at work. Burns' *Hallowe'en* is a picture of the Scottish festivities held on this evening. See HOLIDAY; ALL SAINTS' DAY.

Hallucination, in general, any belief or notion for which there is no foundation in fact. The word is used frequently as synonymous with illusion and delusion, but in its technical use there is a distinction to be made. An illusion is a false mental conception of something which really exists. If the stirring of a curtain by the wind makes one believe for a moment in a human presence, we describe his belief by the word illusion. If a person has a settled

conviction that his friends are trying to poison him, he is said to suffer from delusion, a word implying that the false conception is fixed and not susceptible to correction by the subject himself. An hallucination, specifically, is an apparent perception by the senses of some external object which does not exist as such. If one seems to hear bells ring when there are no bells, sees faces when there are no persons present, we call it hallucination. In other words, the sensation is real, but what psychologists call the "objective stimulus" is lacking.

Hallucinations were regarded formerly as the result of a disordered mind. Lord Brougham at one time seriously endeavored to establish a law which should make hallucination a proof of insanity. At present it is believed probable that all minds experience hallucinations in some form. It is only when the judgment is unable to discriminate and the will unable to keep hallucinations in the background that the subject is in any sense unbalanced or insane.

Hallucinations which seem of the nature of visions as, for instance, the apparition to one person of another who is dead or is at a great distance, the hearing of voices which convey messages when one knows that in reality no sound waves are set in motion, form a class of phenomena which have received the attention of the Society for Psychical Research. Some have become convinced that such occurrences are supernormal. Others regard them as perfectly normal but the result purely of misjudgment, and that experience, the cultivation of the reasoning faculties, and the training of the powers of observation, will lead to the condition where hallucinations will always be interpreted correctly.

Halo, a luminous circle seen sometimes to surround the sun or moon. Often two, or even three, circles are seen and occasionally bands of light, crosses, and arcs of circles tangent to or intersecting each other have been observed. Halos frequently show prismatic colors. In other instances they appear simply as white light. Halos are caused by rays of light falling upon crystals of ice, drops of rain, or the minute particles of moisture that form clouds. To understand the phenomenon fully one must understand the changes light undergoes when it comes in contact with new media.

The halo, or nimbus, as it is called, has been used in art by both ancients and moderns to surround the heads of sacred persons. Ancient poets speak of their deities as being crowned with circles of light when they appear to mortal vision. In Christian art the halo, usually in circular form but sometimes as rays forming a cross, is represented about the head of Christ, and of the Virgin Mary, and often about the heads of saints and martyrs.

Hals, häls, **Franz** (1584-1666), a famous Dutch painter. He studied at Haarlem under the best masters of the day, and soon became remarkable for his fine draughtsmanship. His most celebrated pictures are portraits, many of which are of groups; his ability thus to handle many figures is almost unique. There are two marked periods in his work; his earlier pictures are chiefly remarkable for their good technique, while his later work shows even an added dexterity of touch, coupled with unusually fine effects of light and shade.

Like most artists of the time he led a rough life, and his wife and children had a sorry time of it. Because of his Bohemian life, Hals' pictures treat of every sort of men and women. Among his best group paintings are *A Banquet of Officers* and *The Regents and Regentesses of Oudemannenhuis at Haarlem. The Cavalier, The Toper, The Likenesses of an Old Man and Woman, The Flute Player,* and the *Hille Bobbe* of the Berlin Museum are celebrated portraits.

Ham, the third son of Noah. According to tradition Ham had four sons, Cush, Mizraim, Phut, and Canaan. Canaan became the ancestor of the tribes of Phoenicia and Palestine. The other three sons, grandsons of Noah, migrated southward and peopled the African continent. As is well known, North Africa is peopled by tribes of dark complexion, but white blood. They are known as a Hamitic group. The more important are the Berbers and the Egyptians, including the Copts. Other tribes are so intermixed with negro blood that it is difficult to say whether they are white or colored. However widespread

the custom, it is not correct to speak of a negro as a "son of Ham." It has been suggested that Ammon, the deity chiefly worshiped in North Africa, is a corruption of Ham, their great ancestor. See AMMON; HAMITES.

Hamadryads. See DRYAD.

Hamburg, a free city of Germany. Politically, Hamburg stands with Lübeck and Bremen, on the same footing as Saxony, Prussia, and other German states. The city-state of Hamburg has a territorial area of 160 square miles. It claims to be the outgrowth of a citadel built by Charlemagne in 808. It is situated on the right bank of the Elbe, about ninety miles from the North Sea. Like Glasgow, the city has spent millions of dollars in deepening the channel of the river, so that large ocean-going vessels may reach its wharves. With its suburbs, it has a river frontage of over five miles. The port is the largest on the European continent. A floating dry dock is the largest in the world. The city is intersected by numerous canals, leading to different parts of the empire. Both river and canals are spanned by beautiful bridges. Large basins or artificial lakes within the city give a desirable frontage for the principal hotels and palaces. Notable points of interest are the observatory, natural history museum, town hall, marine office, libraries, and hygienic institute. The Church of St. Nicholas is one of the finest modern churches in existence. Its general style is Gothic or pointed. The western tower, 473 feet high is one of the notable spires of Europe. There are numerous churches and educational institutions, a large art collection, zoological and botanical gardens, etc. Bath and wash houses have been provided at public expense. The city owns its own gas and electric lighting plants. The street railway companies pay large amounts into the public treasury. An immense filtering plant provides pure water.

The city is well managed.

Seven railroad lines and numerous canals center here. Before the World War 25,000,000 tons of freight were handled at the wharves of Hamburg. It is, excepting Antwerp, the most important commercial city in continental Europe. Ranked according to the amount of freight handled, Hamburg is the fifth port in the world. It is exceded by Antwerp, London, New York, and Chicago only. Hamburg ranks next to New York as a coffee market.

The chief manufacturing interests are shipbuilding, iron founding, tobacco and cigar making, sugar refining, distilling, and brewing. The marine insurance business of Hamburg ranks next to that of London. At the beginning of the century the population was reported at 768,349. In 1919 there were 985,779 people in the city and 1,050,359 in the entire state. Hamburg is the second city in size in Germany. Ninety-two per cent of the people are Protestant. An excellent system of schools is maintained. From 30,000 to 80,000 emigrants set sail from Hamburg annually for the United States.

Hamburg is headquarters for wild animals. Carl Hagenback, a Hamburg dealer, has agents in Africa, Asia, Australia, and both Americas, collecting wild animals. If a menagerie, park, zoological garden, or scientific association needs a buffalo from North America, a crocodile from the Nile, a zebra from South Africa, a python from India, a gorilla from the Congo country, a parrot, a monkey, or a constrictor from the Amazon Valley, a chamois from the Alps, a kangaroo from Australia, a polar bear from the Arctic regions, or any one of the thousand and more curious serpents, birds, or beasts, the order may be sent to Hamburg. The animal is to be obtained there if anywhere. It will be sent in halter, crate, cage, or tank by the next outgoing steamer. If the desired specimen is not on hand every effort will be made to secure one.

The fortifications were removed in 1815, but they have left their trace in a fine girdle of green round the city, though too many inroads on its completeness have been made by railways and roadways. The oldest portion of the city still retains the name of Altstadt, though nearly all trace of its antiquity has disappeared, as it was rebuilt after the great fire of 1842. The old town lies low, and is traversed by a great number of narrow canals or "fleets" (for the same word which has left its trace in London nomenclature is used in the Low-German city), which add considerably to the picturesqueness of the meaner quarters, and serve as convenient channels for the transport of

HAMILCAR PUNISHING THE INSURGENT MERCENARIES

From the Painting by G. Surand

goods. They generally form what may be called the back streets, and they are bordered by warehouses, cellars, and the lower class of dwelling-houses. As they are subject to the ebb and flow of the Elbe, at certain times they run quite dry, and afford a field of operation for the *fleetenkieker,* who wanders along the oozy channel to pick up any articles of value, and at other times they are filled 15 to 20 feet above their ordinary level. As soon as the telegram at Cuxhaven announces high tide three shots are fired from the Stintfang at the harbour to warn the inhabitants of the "fleets"; and if the progress of the tide up the river gives indication of danger, other three shots add emphasis to the warning. Then the dwellers on the lower levels make a rapid escape with their property. At the time of the equinoxes the inundation may be repeated for several days in succession; but when all is over the people return like rats to their oozy and dripping abodes. The largest of the public squares of Hamburg is the Hopfenmarkt, which contains the church of St. Nicholas, and is the principal market for fish, meat, vegetables, and fruit.—*Britannica.*

Hamilcar, ha-mĭl'kar, a noted Carthaginian general. He was the hero of the First Punic War. He led the Carthaginian forces in Sicily against the Romans, and suppressed an uprising of the hired forces of Carthage at home. In order to gain possession of the mines of Spain, with which to wage war against Rome, he began the reduction of Spain to a Carthaginian province. When about to leave for Spain he caused his son Hannibal to stand before the altar and swear eternal enmity to Rome. In 228 B. C. he fell in battle with one of the native tribes of Spain. See HANNIBAL; CARTHAGE.

Hamilton, Alexander (1757-1804), was born at Nevis, in the West Indies, January 11, 1757. His father was Scotch; his mother, French. He was sent to New York City to be educated. He was enrolled at King's College when the Revolutionary War broke out. He was a student of unusual precocity. He began writing political pamphlets at the age of seventeen. When hostilities began he organized a company of cavalry and served in the battles of Long Island and White Plains. Washington placed confidence in his ability and made him a member of his staff. After Yorktown, young Hamilton married the daughter of General Schuyler and settled down in New York to practice law. He could not refrain from politics, however. In 1782 he was in the Continental Congress. He took part in the Annapolis Convention of 1786. He was also a member of the Constitutional Convention of 1787. He advocated a constitution granting the general government much more extensive authority than was finally agreed to. When the Constitution was submitted to the votes of the several states for ratification, Hamilton entered into the discussion in its favor with all his heart. With others, he wrote a series of pamphlets devoted to arguments in favor of adopting the new constitution. He carried his own state, New York.

Hamilton was decidedly undemocratic. He wished a "governor" for life, chosen by electors selected by electors, and to his elected king he wished to give an absolute veto upon all legislation. The senate he wished to compose of members chosen for life by electors, while, for the lower house of Congress, he would have had only freeholders vote. The state governments he would have wiped out, or have left wholly dependent upon the central government.

In 1789 Hamilton entered Washington's cabinet as the first secretary of the treasury. His opinions on financial matters, on the public credit, methods of raising revenue, the mint, the bank, manufactures, etc., were law with the administration. Hamilton and Jefferson came into direct conflict. Hamilton left the cabinet in 1795. He advocated putting down the whiskey insurrection with a firm hand. He defended Jay's Treaty with Great Britain. He assisted Washington in composing his farewell address.

Hamilton and Aaron Burr were not only bitter political enemies, but local rivals. Hamilton thwarted some of Burr's dearest plans. Burr, though vice-president of the United States, brought on a duel with his opponent at Weehawken, New Jersey, opposite the city of New York, in which Hamilton was mortally wounded. He died July 12, 1804.

Hamilton's private life was far from right. He was imperious in his manners and had a degree of self-confidence that in any other man would be considered sheer egotism. He was one of the most brilliant and intellectual men ever connected with public affairs in this country. His writ-

ings were, for their day, marvelously ingenious and strongly formed pieces of argument. He possessed a genius for organization and administration such as belongs to few men. The faults of his private life, the quarrelsomeness of his disposition, and the manner of his death have prevented him from receiving the full degree of admiration and praise that is due.

When Hamilton took his seat in the cabinet the United States treasury was empty and without credit. Webster says of him at this juncture, "He smote the rock of the national resources, and abundant streams of revenue gushed forth. He touched the dead corpse of Public Credit, and it sprung upon its feet."

Hamilton was buried in old Trinity Churchyard near the roar and bustle of Broadway—near Wall Street, the busiest center of finance in the world. Over his grave stands a monument bearing this inscription:

ALEXANDER HAMILTON.
The Patriot of Incorruptible Integrity;
The Soldier of Approved Valour;
The Statesman of Consummate Wisdom;
Whose Talents and Virtues
will be admired
by
Grateful Posterity
long after this marble shall have
mouldered into
Dust.
He died July 12, 1804. Aged 47.

See FEDERALIST; BURR.

Hamilton, Ohio, a manufacturing city, and the county seat of Butler County, is 25 miles north of Cincinnati, on the Great Miami River, the Miami & Erie Canal and five railroads. Here in 1791 General St. Clair established Fort Hamilton, naming it for General Alexander Hamilton, and the Fort was used as a base of operations by General Anthony Wayne when he succeeded in opening the Northwest Territory in 1793. Hamilton was one of the outposts of the civilization which built up the central west, and transformed it into one of the best developed sections of America. Hamilton grew apace with this development. Situated in the heart of a fair and fertile valley, and having advantages of water power and later of cheap fuel, it rapidly grew to a position of great importance as a manufacturing center. Its ideal location will always be a big asset to its factories. It is near the center of population of the United States and it has special advantages for reaching all directions. Hamilton made products include machinery, machine tools, paper, Corliss engines, sugar mill and paper mill machinery, pig iron, woodenware, stoves, furnaces, safes and bank vaults, automobile parts and many others. The water, gas and electric light plants are owned and operated by the city. There are excellent public and parochial schools, and churches of all denominations. Population in 1922, 42,264.

Hamilton, Ontario, the third largest industrial center in Canada, and the county town of Wentworth County, is situated on Hamilton Harbor, at the head of Lake Ontario, midway between the Niagara River and the city of Toronto. Owing to its geographical location Hamilton occupies a strategic position that has had much to do with its industrial development, it being an overnight travel point from the industrial, commercial and financial centers of both Canada and the United States and, therefore, a convenient point for the gathering together of material supplies and the distribution of finished products. Besides having excellent water shipping facilities, it is served by the Canadian National, Canadian Pacific and Toronto, Hamilton & Buffalo railways and has direct connection with the New York Central, Michigan Central, Lehigh Valley and other United States lines. It is the center of a system of electric radial railways reaching in all directions and the hub of the provincial government's system of permanent highways, with the result that much shipping is done by motor transport. It is also a port of entry for United States and other foreign shipments.

Despite its prominence as an industrial center, Hamilton, owing to its natural beauty, clean and well paved streets, numerous parks and playgrounds, innumerable trees and well kept residences (mostly of red brick) has earned the sobriquet of "The City Beautiful." Among its thirty-odd hotels are the Royal Connaught and

Wentworth Arms, while its public buildings include the armories, post-office, city hall, court house, provincial hospital for the insane, a very fine public library, and excellent school buildings

INDUSTRY AND COMMERCE. Hamilton is fortunate in having two sources of electric power supply and is said by Sir Adam Beck, the power knight of Canada, to enjoy the lowest lighting and power rates of any city on the continent. It is the home of the Dominion Power and Transmission Company, a private corporation which generates its power at DeCew Falls, 35 miles southeast of the city and, owing to its geographical location, is also the hub of the distributing system of the Ontario Hydro-Electric System, publicly owned and operated, which generates its power at Niagara Falls and distributes it throughout the central part of the province. It is also close to the Selkirk natural gas fields, from which it secures its supply; and both of these have been factors in the city's industrial development, the latest available government statistics showing it to have 790 diversified industries. It has attracted more American industrial capital than any other Canadian city, its factories including large Canadian branches of such outstanding United States industries as the International Harvester Co., Chicago; Firestone Tire and Rubber Co., Akron, Ohio; Westinghouse Co., Pittsburgh; Beech-Nut Packing Co., Canajoharie, N. Y.; Hoover Suction Sweeper Co., North Canton, Ohio; Fuller Brush Co., Hartford Conn., etc. It is also the home of the mammoth Steel Company of Canada and has the largest blast furnaces and steel mills in Canada and is one of the most important textile centers in the dominion. Its chief lines of manufacture include: steel and iron, agricultural implements, tires and rubber goods, cotton goods, knit goods, abrasives, motor trucks, stoves and furnaces, elevators, furniture, boots and shoes wires and cables electrical equipment and supplies, silver and plated ware, tinware, clothing, tobacco products and scores of other commodities. It is the trade center of the famous Niagara fruit belt and a rich general agricultural district.

EDUCATION. Included among the city's educational institutions are fine public schools, a collegiate institute, a new and modern technical and art school, a provincial normal school for the training of teachers, a conservatory of music, an art gallery and several private schools, colleges of music and three public libraries. Five miles east of the city is the historic Stoney Creek battlefield, now utilized as a public park, while in the historic castle in Dundurn Park is situated the museum of the Wentworth Historical Society. The city had a population of 120,235 in 1921.

Hamilton River, or Grand River, flows from Lake Petitskapow, Labrador, 54° 35′ N. latitude, southward through a chain of smaller lakes and over the Grand Falls, thence eastward to the Atlantic Ocean, which it enters through Hamilton Inlet. The Grand Falls of the Hamilton are 250 miles from the Atlantic. Here the river falls 760 feet in twelve miles, the final drop being a beautiful cataract 316 feet high; the water plunges from a shelf of rock about 200 feet wide. The river, before the falls are reached, passes through a cañon 25 miles long and from 400 to 500 feet deep, affording some of the finest scenery in America.

Hamites, a term employed by writers to denote the white people of Africa prior to the inroads of the Arabs. The subdivisions are recognized as:

1. The Berbers, originally a blonde race inhabiting what became known as the Barbary States. The natives of the Canary Islands are probably Berbers.
2. The inhabitants of the valley of the Nile. These were a red-headed people, still represented among the peasant Egyptians.
3. A brown or black haired people, the inhabitants of ancient Ethiopia. Modern representatives are the Galla and the Somali tribes.

There has been much intermingling of Arabic and particularly of negro blood.

Hamlet, Shakespeare's most famous tragedy. It was presented in 1600 or 1601, and printed in 1603. It is the longest of all Shakespeare's plays, containing about 4,000 lines. Hamlet himself speaks 1,569

lines, which far exceeds the total length of the speeches of any other of Shakespeare's characters. Shakespeare obtained the base of his plot from Saxo's *Chronicle of Scandinavia.* Hamlet is a young Danish prince, sensitive, refined, cultivated. Grown to manhood with no knowledge of the evil of the world, such knowledge comes to him suddenly and in a way which seems to demand of him decisive action.

> The Time is out of joint: O, cursed spite,
> That ever I was born to set it right!

Hamlet fails to "set it right," and tragedy inevitably results. The action is of slow development. The relief from the strain of tragedy, so often and so successfully supplied in Shakespeare's plays by the introduction of some humorous element, is perhaps less noticeable in Hamlet than in any other tragedy. The effect of the play as a whole is sombre in the extreme, yet the genius of Shapespeare has excited so intense an interest in the character of Hamlet that no other play has at all times and to all classes of readers, actors, students, and spectators been so universally attractive. The question as to whether Shakespeare intended to represent his hero as insane or as feigning insanity is one that has occasioned endless discussion, and upon which numerous books have been written.

> A beautiful, pure, and most moral nature, without the strength of nerve which makes the hero, sinks beneath a burden which it can neither bear nor throw off; every duty is holy to him,—this too hard. The impossible is required of him,—not the impossible in itself, but the impossible to him. How he winds, turns, agonizes, advances, and recoils, ever reminded, ever reminding himself, and at last almost loses his purpose from his thoughts, without ever again recovering his peace of mind. . . . It pleases, it flatters us greatly, to see a hero who acts of himself, who loves and hates us as his heart prompts, undertaking and executing, thrusting aside all hindrances, and accomplishing a great purpose. Historians and poets would fain persuade us that so proud a lot may fall to man. In *Hamlet*, we are taught otherwise; the hero has no plan, but the piece is full of plan.
>
> Hamlet is endowed more properly with sentiment than with a character; it is events alone that push him on; and accordingly the piece has somewhat the amplification of a novel. But as it is Fate that draws the plan, as the piece proceeds from a deed of terror, and the hero is steadily driven on to a deed of terror, the work is tragic in its highest sense, and admits of no other than a tragic end.—Goethe.

Hamlin, Hannibal (1809-1891), vice-president of the United States during Lincoln's first administration, and otherwise prominent in American public life for many years. He was a strong anti-slavery man, and attracted attention through his advocacy of the Wilmot Proviso. This was during his term as a member of the House; after four years' service he was twice elected to the United States Senate, first as a Democrat, but in 1851 as a Republican. In 1857 he served a year as governor of Maine, his native state. With the exception of four years as vice-president, he spent the years until 1881 in the Senate, going then to Spain as United States minister. See WILMOT PROVISO.

Hammerfest, a seaport of Norway. Latitude, 70° 39′ 15″ N. It is situated on an island near the coast. It is noted as being the most northerly seaport town in the world. It has a considerable trade with Russia. The principal exports are fish, train-oil, and other products of the sea. It is the port from which Arctic exploring expeditions usually set sail, and is a favorite resort for tourists who desire to see the Land of the Midnight Sun. In summer the sun never sets from May 13 to July 29. Conversely, in winter the sun does not rise from November 18 to January 23. The winter population is rather less than 3,000. Cod liver oil is the most valuable commodity. See NORWAY; CURRENTS, OCEAN.

Hammock, a hanging bed. The name is derived from the Spanish *hamaca,* a word of West Indian origin. In the narrative of his first voyage Columbus says: "Many Indians in canoes came to the ship for the purpose of bartering their cotton and hamacas or nets in which they sleep." The Germans have corrupted the name into a word meaning *hanging mat.* The sailor's hammock is a strip of heavy cotton or other canvas several feet in length and a yard wide. Several cords at each end, called clews, are gathered together into a ring. The hammock is hung by the rings to hooks in the beams of the ship. When not in use it is rolled up and stowed. At one time men-of-war were accustomed to string their hammocks around the edge of

the deck to conceal their movements and protect themselves from musket balls. The modern netted hammock, swung under trees or on verandas during the summer season, is made usually of cotton or sisal cord. Bright colors and fringes render hammocks an attractive feature in grove or lawn. See FURNITURE.

Hammond, Ind., a city in Lake County, is connected with Chicago,, Ill., industrially, but is otherwise quite independent of the larger city. Hammond adjoins Chicago on the southeast, is on the Calumet River, and is served by all the railroads that enter Chicago from the east. The principal products of Hammond's industrial establishments are chemicals, packing house products, surgical instruments, bindery products, railway equipment, agricultural machinery, and numerous other commodities. The city has a number of spacious parks, a boulevard system, modern schools and a public library. Hammond was the first city in the United States in which fresh meat was packed for shipment. Population in 1920, 36,004.

Hammurabi, an early, if not the earliest king of Babylon. He is noted chiefly for the Code of Hammurabi, compiled about 2250 B. C. It is the earliest code known. It has many very interesting features. The spirit of the laws is quite Semitic, suggesting kinship to the Mosaic Law. Representative rules are:

If a man, in a case, utters threats against the witnesses, or does not establish the testimony that he has given, if that case be a case involving life, that man shall be put to death.

If a man offers grain or money to the witnesses, he shall himself bear the sentence passed in that case.

If a man rents a field for cultivation and does not produce any grain in the field, and does not perform the work required on the field, . . . he shall give to the owner of the field grain on the basis of the adjacent fields.

If a man neglects to strengthen his dike . . . and a break is made in his dike and the water carries away the farm land, the man in whose dike the break has been made shall restore the grain which he has damaged.

If a builder builds a house for a man and does not make its construction firm, and the house which he has built collapses and causes death, the builder shall be put to death.

If a builder builds a house for a man and does not make its construction meet the requirements, and a wall falls in, that builder shall strengthen that wall at his own expense.

Hampden, John, an English soldier and statesman. He was a native of Oxfordshire and was educated at Oxford University. For many years he led the life of a country gentleman. He was related to Oliver Cromwell. During troublous times he and Cromwell contemplated migrating with other Puritans to New England. He was a member of Parliament when the contest between that body and Charles I broke out, and helped pass the Petition of Right, 1628. He was foremost in resisting the king's demand for ship money. Though defeated in the courts, whither he had carried the question, he became a popular hero, and was known as the patriot Hampden. He was one of the five members whom the king attempted to arrest in the House of Commons. When hostilities actually commenced Hampden took command of a regiment of cavalry, serving under the Earl of Essex. He received a wound in a skirmish with Prince Rupert and died before the result of the great English civil war was known. See PURITAN; BILLS OF RIGHTS.

Hampton, Wade (1818-1902), a distinguished Confederate soldier and American statesman. A grandson of General Wade Hampton of Revolutionary fame, he was born at Columbia, South Carolina, and as a young man studied law at the state university. Instead of practicing, however, he engaged in the management of his great plantation until the secession of South Carolina. Though he had formerly favored the Union party he now followed his state. A private regiment, equipped by him and known as "Hampton's Legion," was prominent on the side of the Confederacy throughout the war, especially at Bull Run and in the Peninsular Campaign. Hampton was rapidly promoted until in 1864 he was made lieutenant-general and commander of all the Confederate cavalry. The war over, he did all in his power to soften the bitter feeling in the South, and to bring about harmony in the disrupted nation. He was elected governor of South Carolina in 1876 and two years later entered the United States Senate where he

served twelve years. In 1893 he was appointed United States Commissioner of railroads, in which capacity he remained until 1897. He died in 1902.

Hampton, an English village situated on the Thames, a few miles above Westminster Abbey. It may be reached by rail, or by one of the numerous wherries plying on the river. The village is noted as the seat of Hampton Court, a royal residence built by Cardinal Wolsey for his own use, but subsequently presented to Henry VIII. It was the favorite residence of James I. The order to make the translation known as King James' Bible was given here. The buildings are of red brick with battlemented walls. Since the time of George II the king has ceased to reside there. The buildings are used for various purposes. A score or two of rooms in suites, seemingly acres in extent, are devoted to galleries of paintings and antiquities. A portrait of the cardinal hangs in the great hall. The latter is over 100 feet in length, with other dimensions to correspond. The visitor is much more interested in the grounds, however. The garden in front of the palace is laid out in flower beds and shady avenues. A grapevine of the black Hamburg variety, planted in 1769, has attained an immense size. The stem is over a foot in diameter and presents a mass of foliage over 100 feet in height. In productive years as many as 2,500 bunches of fine grapes have been obtained from this vine. In the so-called wilderness adjacent, there is a noted maze or labyrinth. It consists of a neatly kept hedge about twice as high as a man. Although not exceeding half an acre in area the hedge has so many windings, lanes, and deceptive gaps, that, even though one knows the way, it requires several minutes of rapid walking to reach a plot of grass at the center. The glory of Hampton, however, is a royal park of about 11,000 acres. It is planted with white thorn, limes, and horse-chestnuts. In June or toward the end of May, when the latter are in full blossom, the display of bloom is unequaled, it is said, in Europe. Every spring the newspapers announce the fact that the chestnuts of Hampton are in blossom. At this season thousands and thousands of people from the city and the country go out to wander through the park. See LABYRINTH.

Hampton Normal and Agricultural Institute is an undenominational industrial school for Negroes and Indians at Hampton, Va. It was opened in 1868 by the American Missionary Association under the principalship of Gen. Samuel Chapman Armstrong. Its charter of incorporation, granted by the State of Virginia in 1870, provides for its management by a board of seventeen trustees empowered to fill vacancies.

The purposes of Hampton Institute are: "For the instruction of youth in the various common school, academic and collegiate branches, the best methods of teaching the same, and the best mode of practical industry in its application to agriculture and the mechanic arts." Dr. Hollis B. Frissell was principal from 1893 to his death in 1917.

The school was opened with two teachers and fifteen students in an old army barracks. There are now over 122 instructors and the enrollment, including the Normal, Practice, and Summer Schools, exceeds 2,100. The institution owns over 1,000 acres of land and 140 buildings, including large modern dormitories. The Huntington Memorial Library contains 50,000 volumes, including some 3,000 relating to Negroes and Indians.

The Institute, from 1878 to 1912, received some aid from the U. S. government for the partial support of its Indian students. It has also received from time to time, some aid from the Morrill and Land Grant Funds, through the State of Virginia; from the John F. Slater Fund and General Education Board; and from private gifts. The endowment and other invested funds exceed $4,500,000. The annual expenses are about $450,000. Of this amount about $165,000 come from donations and appropriations from educational boards.

In addition to text-book work, the girls are taught cooking, sewing, the care of a house, and modern schoolroom practice in home economics.

The boys learn shopwork of various kinds. They are trained, not only to become teachers, but tradesmen, business men and agriculturists. Improved methods of gardening, field work and the care of stock are taught on the farm.

Students are charged $18 a month for living expenses, and, so far as possible are given an opportunity to pay in labor.

Over 850 students, chiefly Negroes, but including a few Indians from widely-scattered reservations, live in the school dormitories. Hampton has always been co-educational. Military drill is conducted under a U. S. Army officer (retired), detailed in charge of the Reserve Officers' Training Corps unit.

Hampton Roads, a wide, deep arm of Chesapeake Bay at the mouth of James River, between Hampton and Norfolk, va., with Newport News, Old Point Comfort, Fort Monroe, Fort Wool and Thimble Shoal Lighthouse at or near the entrance to the bay.

Here, in 1861, the Confederates seized the United States frigate *Merrimac,* which they renamed the *Virginia,* and sent her to attack the United States vessels lying in Hampton Roads. The *Cumberland* and the *Congress* were destroyed and as the remaining vessel, the *Minnesota,* was about to be attacked the *Monitor* arrived; and a spirited contest followed between the *Monitor* and the *Virginia,* which finally withdrew. This was the first battle between ironclads, and was epoch-making, since it revolutionized naval warfare. See MONITOR and MERRIMAC.

Hampton Roads Conference, in the history of the United States an informal consultation, which was held on board ship near Fort Monroe, Va., Feb. 3, 1865, with reference to the conclusion of peace between the Federal government and the Confederacy. Those present representing the United States were President Lincoln, and Secretary of State Seward; of the Confederacy, Vice-President Stephens, Assistant-Secretary of War Campbell and Senator R. M. T. Hunter. No basis of agreement could be reached during the conference, since President Lincoln refused to treat on any terms that did not provide for the full re-establishment of the Union. The conference was brought about primarily by Francis P. Blair, who thought that the war might be brought to an end and the two sections of the country united.

Hamster, a burrowing animal of the rat kind. It differs from a rat chiefly in having two cheek pouches. On that account the pocket gopher, while not closely related, has been called the American hamster. The common hamster inhabits fertile fields of Europe and Asia. It is a stout little animal, about ten inches long, with a hairy tail. The prevailing color is black. It burrows into the ground, making galleries in which it stores food. A pair of hamsters has been known to hoard 170 pounds of grain. It is very prolific. As many as sixteen young are brought forth at a time. It has become such a pest in Belgium that the government offers a four cent bounty for its destruction. See RAT.

Hamsun, Knut (1859-), a Norwegian novelist, dramatist, and poet who, beginning life as the son of a poor tailor. has risen to a position of world prominence in literature. He was born at Lom, Gudbrandstal, and was raised by an uncle in one of the Lofoten Islands. He became a cobbler's apprentice, and at the age of eighteen had saved enough money to have published a poem and a novel. These works were of small merit, but the young genius was not discouraged. Mr. Hamsun then entered the University of Christiania, but was forced to leave because he was not prepared for the work he attempted. In the hope of becoming a Unitarian minister, Mr. Hamsun went to America, where he was at various times a farm laborer, a street car conductor in Chicago, and a lecturer on French literature in Minneapolis. Returning to Christiania, he again attempted authorship, but without success. After serving for three years on a Newfoundland fishing boat, Mr. Hamsun wrote for a Danish periodical his novel fragment, *Hunger,* which was later expanded and published in book form. This work, portraying the struggles of a young writer, won him recognition as one of the first among young Northern authors. Since then, his rise has been steady, but he did

not become generally known to the English-speaking world until a few years ago. His works have been translated into seventeen languages. After his experiences in the United States, Mr. Hamsun wrote a brilliant, but unfavorable criticism of America entitled *The Spiritual Life of America.* Those of his works that have been translated into English are *Hunger; Shallow Soil,* in which he exposes the intellectual and spiritual poverty of life in a cosmopolitan city; *Pan,* a charming prose poem; *Growth of the Soil,* his masterpiece; *Wanderers and Dreamers.* Mr. Hamsun was awarded the Nobel prize for literature in 1920, the first time the prize had been awarded since 1917.

Hancock, John (1737-1793), an American merchant and statesman. He was born at Braintree, Massachusetts, always lived in that state, and died at Quincy. He was graduated at Harvard in 1754. He learned the business of an importing merchant in the counting house of an uncle, who left him $400,000 with which to carry on the business. Samuel Adams was without a dollar. Hancock was the wealthiest merchant in the city. It is difficult to say which was the more determined opponent of the oppressive acts of Great Britain. Both were members of the Massachusetts General Court. Both sat in the Provincial Congress. Both were honored by General Gage as the two rebels "whose offenses are of too flagitious a nature to admit of any other consideration but that of condign punishment." Both were expressly omitted by name from an act of general amnesty with which the British government sought to conciliate the colonies in 1775. From the beginning, Hancock was in the thick of the contest. He owned the sloop Liberty, whose seizure brought on the riot of 1768. He demanded the removal of troops after the so-called Boston massacre. He delivered a fiery address at the funeral of the victims of that affair. He was president of the Continental Congress, and his bold signature appeared prominently on the Declaration of Independence. He was the first governor of the state of Massachusetts. He had faults enough, no doubt, vanity and jealousy, it is said, but none doubt his patriotism and strong common sense. His wealth, education, social standing, determined character, and reputation for strict integrity were of incalculable service to the cause of the patriots. See ADAMS, SAMUEL.

Hancock, Winfield Scott (1824-1886), an American soldier. He was born at Montgomery Square, Pennsylvania, and died on Governor's Island, New York. He was a graduate of West Point and served with credit in the Mexican War. He was with the United States forces in Florida during the Seminole War, was sent to Kansas during the border struggle, and was stationed subsequently at various points in Utah and at Los Angeles, California. At the outbreak of the Civil War he was assigned to the Army of the Potomac with the rank of brigadier. He took part at Antietam and Fredericksburg, saved the day for the Federals at Chancellorsville, and, though not in chief command, he was the hero of the Union army at Gettysburg. After the close of the war he commanded the military departments of Missouri, Texas, the Atlantic, Dakota, and the Atlantic again. Grant regarded him as a brilliant leader, a soldier of merit. In 1880 he was nominated by the Democratic party for the presidency.

Hand, the part of the body which terminates the arm, consisting of the palm and fingers, which are connected to the arm at the wrist. The hand of a human being is made up of twenty-seven bones, the fingers proper containing fourteen. These bones are jointed so as to admit of a variety of movements, the most significant being those by which the hand is flexed backward, forward and sideways, and by which the thumb and fingers are moved in different directions.

The chief muscles which determine these movements are called flexors, and passing down the fore-arm, they are attached by tendons to the phalanges of the fingers; the so-called extensor muscles behind designed for the purpose of extending the fingers. Two muscles flex all the fingers, except the thumb, which is provided with a separate long and short flexor. There is a common extensor muscle for the fingers, this extending down the back of the fore-arm,

and dividing the wrist into four tendons, one for each finger, each being attached to all three phalanges. The thumb has a short and a long extensor, and the fore-finger and little finger have each an extensor of its own. The tendons of the muscles of the hand are interlaced and bound together by bands and fibers, thus making possible a more complete unity of action. In executing instrumental music it is sometimes difficult to give independent movement to one finger, without the others taking part, but with practice this may be readily accomplished.

The movement which characterizes the human hand is the opposition of the thumb, to the fingers, alone or united, this being a result of the length of the thumb, its metacarpal bone not being placed on the same plane as the other four, and from the action of the long flexor of the thumb, this being peculiar to the human hand. The action of this muscle completes the action of the other motor of the thumb, and permits man to hold a pen, a needle, or similar objects, and gives to the hand the necessary dexterity for the execution of delicate work. The hand, therefore, with its highly specialized muscles, belongs to man alone. It cannot be placed in the same class as in that of the ape, a normal organ of locomotion. It is the organ of touch essentially, and prehension. A layer of adipose tissue, of close formation, protects, without lessening its power or its delicacy.

Handball, a game originating in Ireland, but now one of the sports under the regulation of the Amateur Athletic Union of America. The game consists in striking a ball, larger and more elastic than a baseball, on its rebound from a back wall within a space marked off by a line drawn sixty feet from the wall, the "over line." Side boundaries are drawn twenty-eight feet apart, thus forming a rectangle twenty-eight by sixty feet. Midway between the back wall and its parallel, the over line, is drawn a second parallel to both, the "short line." Every ball from the wall must fall between these two lines to be in play. The game is started by one man's "tossing out" the ball onto the ground and hitting it on the rebound against the end wall with the palm of his hand. If it falls within the short line and the other player fails to return it, the server scores an "ace." Should it be returned and the original server fail to send it back, it is a "hand out." The other man becomes server then, and so the game continues. The first player to get fifteen or twenty aces, as agreed, wins the game. See ATHLETICS.

Handel, George Friedrich (1685-1759), a noted musician. Handel was born at Halle in Saxony. His father wanted him to be a doctor, but he disliked to study and used to steal away to the garret to play on an unused spinet. When he was eight years old his father overheard him playing on the chapel organ, and was so pleased that he decided to give him a musical education. Handel studied for a time in Italy. In 1710 he became chapel master to George, Elector of Hanover. Later, when the elector became George I of England, he took Handel with him to London. Here Handel was a great favorite in court circles. He is popularly considered the greatest cathedral organist the world has produced. His compositions were majestic and solemn, but marked by extreme simplicity. Among his oratorios are *Israel in Egypt, Saul, The Messiah,* and *Samson.* Handel lies buried in Westminster Abbey. So far as English art goes, Handel's compositions rank in music with Shakespeare's plays in literature.

Handicap, an extra requirement placed, in a competition, upon those who have by their past achievements proved themselves to have greater ability than their competitors. The practice is so called from the drawing of lots from a cap. In athletics the handicaps are based as equally as possible upon the players' past records. A whole team may be handicapped by allowing the weaker team more men. The handicap may take a variety of forms. The weaker contestant is sometimes allowed a certain number of points in addition to what he makes, one man may start before another, the different players

may carry graded weights, etc. In horse racing the better horse is sometimes required to carry a heavier jockey.

Hang-Chow, häng'chow, a Chinese city. It is situated at the head of an estuary, fifty miles from the East China Sea. It is the southern terminus of the great Chinese canal. It lies about 100 miles by water southwest of Shanghai. The city is built in the form of an oblong. It is surrounded by strong walls about eight miles in length. For a Chinese city, the streets are remarkably clean. The business sections are attractive. The manufacturing interests are large. A seventh of the population is said to be employed in reeling and weaving silk. The city is noted for its silks, cotton cloth, tapestry, ivory carvings, lacquered ware, fans, and screens. The population is estimated at 729,948. A considerable part of the population lives in houseboats. Although the head of the estuary is four miles wide at this point, it is crowded with ships and junks of all descriptions. Foreigners of all nations are at liberty to trade.

Hanging Gardens. See BABYLON.

Hankow, hän'kow', a Chinese city. It is situated on the Yang-tse-Kiang River, at the head of deep water navigation, 688 miles from the sea. It is near the center of China proper and is noted for its tea trade. The annual exportation of tea is not far from 120,000,000 pounds. The Chinese government has granted permission to the British, Germans, French, and Russians to form settlements within the city, the inhabitants of which are exempted from the laws of China, being governed by their own consuls. The population is estimated at 289,804.

Hanna, Marcus Alonzo (1837-1904), an American capitalist, political leader and one time Senator of the United States. He was born at Lisbon, Ohio, and educated in the Cleveland public schools and at Western Reserve College. In 1858, he entered the wholesale grocery business in Cleveland; and through his initiative and unbounded energy he became, by 1885, head of a large coal and mining firm; and later extended his business activities to embrace banks, street railways, newspapers and other concerns. Mr. Hanna took an active interest in politics as early as 1880. He became a force among Cleveland Republicans. Later he became one of the most potent single forces in the Republican party and at the same time one of the most heartily disliked men in the United States. After securing the nomination of Mr. McKinley for President, Mr. Hanna was appointed United States Senator from Ohio to complete the unexpired term of John Sherman, at the expiration of which he was elected for the next full term. He was always actively interested in questions involving capital and labor, and in 1902, as a member of the committee of concilation of the National Civic Federation, he assisted in settling the anthracite coal strike.

Hannay, James (1842-1910), a Canadian journalist and historian whose *History of Acadia* has dispelled many of the notions of English cruelty to the Acadian peasants—notions based upon Longfellow's poem *Evangeline.* He was born at Richibucto, New Brunswick, and worked on newspapers in St. Johns, New Brunswick, while studying law. He was called to the bar in 1867, and became official reporter of the supreme court of New Brunswick. Mr. Hannay was in later life connected editorially with the St. John *Daily Telegraph,* the Montreal *Daily Herald,* the Brooklyn *Daily Eagle,* and was editor of the St. John *Gazette* in 1888 and editor of the *Telegraph* in 1893. He was an able lecturer and editorial writer. His principal works besides the one mentioned are *Captivity of John Gyles Among the Milicetes, History of the War of 1812 and History of New Brunswick.*

Hannibal (247-183 B. C.), a Carthaginian general. He was the son of Hamilcar Barca, the hero of the First Punic War. At the age of nine, standing at the family altar, he swore eternal hatred to the Romans. He followed his father in his campaign in Spain, using his leisure in the meantime to read Greek literature. At the age of twenty-six he took command of the Carthaginian army in Spain and carried on his father's work. He extended the Carthaginian frontier to the River Ebro. The ancient Greek colony of Saguntum was

situated near the coast. This city he proceeded to besiege with a large army. Saguntum applied to the Romans for aid. Rome sent a demand to Carthage that Hannibal and his army be recalled from Spain. Upon a refusal Rome declared the Second Punic War. One Roman consul was sent toward Spain, the other was dispatched leisurely to wrest Sicily from the Carthaginians. Hannibal surprised his enemies by an audacious invasion of Italy. He crossed the Ebro with 80,000 troops, forced his way over the Pyrenees, traversed the valley of the Rhone, and scattered the Gallic tribes that attempted to impede his progress. He entered the valley of the Po by way, it is thought, of the Little St. Bernard. This march is considered one of the military feats of history. Only 26,000 of his troops reached Italy. "Emaciated scarecrows" they were called. The bones of the remainder were scattered over the plains of southern France or lay amid the snows of the Pyrenees and the Alps. With this small force of soldiers, each man a trained fighter, Hannibal fell upon and destroyed one Roman army at the ford of the Ticinus and another at the Trebia. His former opponents, the Gauls, now came to his standard.

The next spring Hannibal surprised a Roman army at Lake Trasimene; 40,000 Romans, caught in a blinding mist, were annihilated. Then Hannibal proceeded to devastate Italy with fire and sword. He was inventive. He was the first person to use the African elephant in European warfare. The Romans were utterly unable to stand before a charging line of these huge animals. At one time he won a victory by binding masses of wild grape vines between the horns of oxen. The vines were then set on fire, and the infuriated animals were driven charging through a pass into the ranks of the Romans. The Carthaginian soldiers followed in their wake, gaining an easy victory. He maintained a large army for years without help from home, living entirely on the plunder of the enemy. For an account of the way in which his movements were delayed, rather than impeded, the reader is referred to the article on FABIUS. The Romans called Fabius "Laggard," but he was not to be turned from his policy "to wear out Hannibal and to gain breathing time for Rome."

The next season the Romans raised an army of 90,000 men, with new consuls in command. Hannibal met them, and a pitched battle followed at Cannae. Sixty thousand Romans fell and 20,000 were taken prisoners. Among the dead were Emelius Paulus and a number of Roman Senators.

Hannibal's famous march and his early campaigns in Italy have won for him the reputation of being one of the greatest soldiers the world has ever known. But through Roman diplomacy, the tribes of Italy failed to rally around Hannibal, and the people of the Mediterranean refused to overthrow Rome. Though at one time Hannibal and his forces were at the very gates of Rome, his fortunes began to wane. From this on he was unsuccessful in his battles.

Hannibal was accused of stirring up Antiochus of Ephesus against the Romans, but this led to the defeat of both Antiochus and Hannibal. The Romans demanded that Hannibal surrender, whereupon he committed suicide by poison. See CARTHAGE, FABIUS.

Hannibal, Mo., a manufacturing city of note, is 120 miles northwest of St. Louis, on the Mississippi River and on four important railroads. It has boat connection with many cities on the river, and is connected with Illinois by a steel railroad and wagon bridge. Hannibal, was once a center of the lumber industry, but this industry moved north, and the city now contains factories producing cement, lime, shoes, car-wheels, wagons and stoves. It contains a high school, modern graded schools and a public library. The electric light and power plant is owned by the city. The population in 1920 was 19,306.

Hanover a province in northwestern Prussia, which borders on the North Sea. It has an area of 14,869 square miles, and a population of 3,017,366. It is situated in the Harz Mountains district, which is rich in minerals, and mining is one of the chief industries. Grain, flax, hops, tobacco and potatoes are grown. The chief

manufactures are cotton and woolen goods, machinery and leather. Shipbuilding is carried on extensively. The famous university of Göttingen is located in Hanover. Hanover, the capital, has a population of 392,805, and is the twelfth German city in size. It was founded before 1100, and joined the Hanseatic League in 1481. Prior to 1866 Hanover was an independent kingdom. Through the marriage of an elector of Hanover with a granddaughter of James I, the House of Hanover became connected with the Stuarts of England. At the death of the English queen, Anne, in 1714, George Louis, elector of Hanover, became also George I, king of Great Britain. In 1814 Hanover was raised by the Congress of Vienna to the rank of a kingdom. Three Georges were kings of Great Britain and electors of Hanover. George IV and William IV were kings both of Great Britain and of Hanover. In accordance with a custom known as the Salic law, the crown of Hanover could not be worn by a woman. When Victoria was crowned queen of Great Britain, the crown of Hanover went to the nearest male heir, the duke of Cumberland. In the war between Austria and Prussia, Hanover had the misfortune to side with Austria, the losing side. At the conclusion of peace the little kingdom was incorporated with Prussia. It was in this dual capacity, as a British and a German prince, that George III obtained the German troops that lost his battles in the war of the American colonists. See GEORGE I.

The capital, Hanover, is a picturesque old town, with many old residences and public buildings. The modern, new quarters have fine promenades, a large wood with beautiful walks, the old *Welfenschloss,* now a polytechnic school, and the Royal Library, which contains over 190,000 volumes. It became the capital in 1636.

Hanseatic (hăn-sē-ăt'ĭc) **League,** a confederation of the northern German towns. The German name for the League was the Hansa, a word meaning union. The Hansa was formed by commercial cities to protect their pack trains from robbers on land, their ships from pirates on sea, and their towns from the oppression of princes. As early as 1241 Hamburg and Lübeck formed an alliance to keep a road open across the neck of land that separates the North Sea from the Baltic. Several small leagues of this sort were merged into the Hansa.

During the fourteenth century it became a powerful confederation. At its height ninety towns in the territory included in the German empire, the Netherlands, and Belgium, flew the Hansa banner. The league formed commercial treaties with distant peoples, and even enforced its claims by dint of arms. A trading station on the Thames was maintained in London. It was known as the Steel Yard. Like the Hudson Bay Company and the East India Company of later times, the Hansa established distant agencies.

Although the importance of the league was great its organization was never a very close one. The deputies of the various cities assembled at Lübeck to consider questions of general importance. The decrees of this meeting, or diet, had no binding force unless ratified by the merchants in council of the various cities of the league. Naturally enough a general system of weights and measures prevailed throughout the confederacy. The canal system of north Germany was begun under its influence. The great service of the league was the carrying out of its original purpose, the protection of commerce by land and sea. As soon as robbers and pirates had been suppressed and the government of the various princes became more established and powerful, the mission of the league was practically at an end. Jealousies sprang up between the different cities. The large towns aimed to divert trade from the smaller ones for their own advantage. The Thirty Years' War brought the league practically to an end. In 1669 the last diet was held. At the present time there is but one political vestige of the old Hansa. The cities of Lübeck, Bremen, and Hamburg are still independent and form sovereign states of the German Empire.

In their prime the Hanseatic cities were centers of enterprise and culture. Their merchant princes possessed enormous wealth. The old cathedrals, town halls, market places, homes of the merchants,

HANNIBAL'S ENTRANCE INTO ROUSSILLON
From the Painting by H. Perrault

council chambers, wood carving, antique furniture, rich hangings, priceless tableware, now the admiration of students, date from the period of the Hanseatic League.

Hapgood, Norman (1868-), an American editor and author who has written with force and directness upon almost every known subject of interest to the public, was born in Chicago, Ill., and educated at Harvard University and Harvard Law School. Beginning his literary career as dramatic critic for the *Commercial Advertiser,* New York City, Mr. Hapgood has subsequently been one of the editors of the *Bookman,* editor of *Collier's Weekly,* and editor of *Harper's Weekly.* Since resigning the editorship of the latter magazine in 1916, Mr. Hapgood has given his attention exclusively to political affairs. He is the author of *Literary Statesmen; Daniel Webster, Abraham Lincoln, George Washington, The Stage in America* and *Industry and Progress.*

Happy Valley, The, in Dr. Johnson's *Rasselas,* a peaceful garden where the Prince of Abyssinia lived. It could be reached only through a cave in a rock, and the difficulty of leaving it was as great as that of reaching it. See RASSELAS.

Hapsburg, the imperial house of Austria. The original castle of the Hapsburgs is situated in Switzerland on the banks of the Aar, not far from Zurich. The family of the Hapsburgs is one of the most important in European history. Its rank is equal even to that of the Bourbons of France, the Hohenstaufens of Germany and the Tudors and Stuarts of Great Britain. The name is German, meaning a hawk's crag. From 1438 to 1806 nearly all the German emperors were Hapsburgs. Emperor Charles V, Maria Theresa, Rudolph, and several Maximilians were members of the family. It is said that the novelist, Fielding, was descended from a Hapsburg who settled in England. The late ruling house of Austria was a continuation of the Hapsburg line.

Harbin, a city projected by the Russians as the capital of Manchuria. It is situated on the south bank of the Sangari River, a branch of the Amur, near the forty-sixth parallel of north latitude. The Trans-Siberian railway branches here for Vladivostock and for Dalny, near Port Arthur.

The history of Harbin is of unusual interest and gives a clue to the kind of private interests that led Russian capitalists and Russian officials to urge expansion in the East. The Russians took possession of Manchuria under ostensible leases from China. They decided that this site on the bank of a navigable stream 350 miles west of Vladivostock and 600 north of Dalny was the spot intended by fate for a city which should be Russian headquarters. The engineers ignored a village of the name three miles away and laid out the town of Harbin, western fashion, amid fields of millet on a level prairie. This was to be the eastern headquarters of Russia. A modern railway station and freight houses were erected.

The city grew astonishingly. When Japan declared war with Russia, the young city surprised itself. It became the center of a great military movement.

> The immense armies of the Czar, transported across Siberia, came to a halt at Harbin and were here encamped and forwarded on to the front as their time came. Here was the real military headquarters. . . . Here the officers left their families, some wives, some mistresses; and here the camp follower halted and went no further; here the gamblers and sharpers plucked the easy-going and good-natured soldier, and the commercial adventurer divided the loot with the mercenary official. To Harbin swarmed the women, who made it their abode, bringing with them the luxuries of Paris and the life and atmosphere of the boulevards. Theaters multiplied, *cafés chantants* were in full blast, drinking saloons and pleasure resorts abounded. No less than twenty-six music-halls catered to the pleasures of the soldiers, running day and night without pause. The pace was swift, life was short, and extravagance and recklessness the order of the day. Champagne flowed like water. Magnums took the place of the ordinary pint or quart bottles. They cost more and the money would go quicker. . . . Houses were at a premium, and fortunes were made in real estate and building transactions. Chinese and Jewish money-lenders flourished, jewelry dealers were reaping a glorious harvest, and fashionable dry-goods stores did a thriving trade.
>
> Breweries, four of them, were hastily erected; eight vodka distilleries were placed in operation . . . and other industries were rapidly financed and carried through. Profits were enormous. . . . Everything was lovely, and as long as the boom lasted no one cared to look ahead.

When the Treaty of Portsmouth brought

the war to a close, the Russian capitalist sadly, and the Russian soldier gladly, turned their backs on Harbin. The merchants had ignored the natives. When the Russians left, they had no trade. Flour mills making 1,000,000 pounds of flour a day lost their customers. There was no one to drink the beer; no one to drink the vodka; the breweries and distilleries closed down. The theaters were closed for want of patronage. Elegant houses stood vacant. Nobody wanted to build; the brickyards and sawmills closed down. The only building needed by Russians was an office for a consulate. The native town plods on in the old way, a center of native trade, while of the new town, Harbin, the center of expected fortunes, Mr. Rea writes:

> Grass grows in the streets; no smoke issues from the tall chimneys of the mills The large and costly stocked department stores open for the day and only a casual customer appears. Theaters have closed. Only one or two *cafés chantants* invite the midnight pleasure seeker, in place of the previous twenty-six. The houses are out of repair and the plaster and ornamentation of many of the large buildings has fallen away, disclosing the naked lath, revealing the fact that the buildings in part were only imitation stone. The town is existing on the expenditure of the railway. The salaries of the employees maintain the few stores. . . . The last financial year of the bank was closed without the payment of the customary dividend. The railway is losing at the rate of 5,000,000 roubles per annum.

If the Russians had continued to hold Manchuria the reasonable expectations of Harbin might have been realized. As the case stands the future of Harbin is uncertain. Russia has no further interest. China does not take to anything new, and Japan has no authority to step in. So far as soil, climate, transportation, and natural resources go, Harbin is situated favorably for manufacturing and jobbing on a large scale. In America it would develop rapidly into an Omaha, a Cincinnati, or a St. Louis. It may be a century before Harbin comes to its own again.

Harbord, James Guthrie (1866-), an American army officer, was born at Bloomington, Ill., and educated at the Kansas Agricultural College, the United States Infantry and Cavalry School and the Army War College. Between the years 1889 and 1891 he was successively private, corporal, sergeant and quartermaster-sergeant, being promoted in the latter year second lieutenant of the fifth cavalry. Rising steadily in rank, he was promoted brigadier general of the National Army in 1917, and in the same year made chief of staff of the American Expeditionary Force in France. General Harbord served with signal distinction in France, receiving decorations from the United States and from several foreign nations. He was chief of the American Military Mission to Armenia in 1919. After the close of the war, General Harbord was mindful of the needs of America's demobilized soldiers, and worked untiringly that each man might receive vocational training and so be properly rehabilitated. In 1921 General Harbord was appointed department chief of staff of the Army of the United States.

Harcourt, Sir William George Granville Venables Vernon (1827-1904), a British statesman of the Liberal party. He was born at Nuneham Park, Oxford. His higher education was at Trinity College, Cambridge, and in 1854 he was admitted to the bar. His university called him as professor of international law in 1869, after he had spent two years as queen's counsel and one year as member of Parliament from the city of Oxford. Four years later he retired to become solicitor-general under the premiership of Gladstone, and at this time he received his title.

For five years from 1880 he served as home secretary. He was always a strong advocate of Irish home rule as favored by Gladstone, whose measures favoring it were defeated. The nine years before his death he served as member of Parliament from West Monmouthshire. In the interval between this post and his secretaryship he acted twice as chancellor of the exchequer, one of the most important positions in the British government. He was leader of his party in the House for three years. In debate he was notable for his readiness and his satirical tongue; he possessed an intimate knowledge of public affairs, and wrote with ability on his particular subjects.

Hardecanute [Hardecanut] (about

1019-1042), one of three successive Danish rulers of England and Denmark. He was the son of Canute the Great and Emma of Normandy, and at the time of his father's death was ruling as underking in Denmark. Although Canute intended that Hardecanute should have the crown of England, the English Witan decided in favor of Hardecanute's half brother Harold. Hardecanute made no effort to obtain the crown; but when Harold died in 1040, the Witan elected Hardecanute to the throne. Arriving in England with 60 ships, he immediately extorted a large sum for their maintenance. The kingdom was administered by his mother and Godwin, Earl of the West Saxons, while Hardecanute, who was violent and unscrupulous, gave his attention to the pursuit of coarse pleasures. His reign was peaceful, and with him died the Danish line in England.

Harding, Warren Gamaliel (1865-1923), an American statesman, United States Senator from Ohio and twenty-ninth President of the United States (1920), was born on a farm near Blooming Grove, Ohio. His father was the village doctor. Warren was the oldest of eight children and early in life began to contribute to the support of the family. Lifting himself through the stages of farmer boy, member of a railroad construction gang, country school teacher, printer's devil, linotype operator, editor-publisher, business man and banker by his own efforts, is, in brief, the story of Warren G. Harding's career previous to his entrance into public life.

At the age of 14, Harding entered Ohio Central College at Iberia, where he soon showed his qualities of leadership. He worked his way through college, by engaging in any honorable work that came to hand, and graduated with high honors. As editor of the college paper, he showed his aptitude for journalism, and after graduation, began work on the Marion, Ohio, Mirror. Within a short time, however, with the assistance of his father, he bought the Marion Star, in which he still holds a controlling interest. At the time of its purchase, the Star was a struggling paper in a small county seat, but the untiring energy, editorial ability and business acumen of the young publisher gradually placed the journal on a firm foundation.

When Warren Harding purchased the Star, Marion was a town of 4,000 inhabitants, it is now a city of nearly 30,000. As the city grew, Mr. Harding became identified with several of its leading enterprises, and he has served on the boards of directors in some of these corporations.

The circulation and influence of the Star has more than kept pace with the growth of the city. It now has a larger circulation than any other daily in cities of Marion's size in the country. It also exerts a wider influence and is more frequently quoted than other journals outside the larger cities.

Political Career. President Harding has always taken an active interest in the affairs of his state and of the nation. At 22 he was a delegate to the state convention of his party, and through his editorials he became widely known and strongly influential. Twice he represented his district in the Ohio Senate, and from 1904 to 1906 was lieutenant governor. In 1912, he entered the race for governor, but the split in the republican party gave the victory to the Democrats. In 1914, Mr. Harding was elected to the United States Senate. In 1916, he was made Chairman of the Republican National Convention. In 1920 he received the Republican nomination for president and was elected the following November with an overwhelming majority, receiving 404 of the 531 electoral votes. He is the first Senator elected president while holding his seat.

Personal Traits. President Harding has an impressive personality, which is emphasized by his height of six feet. He is a man of simple tastes, and is actuated by a kindly and sympathetic spirit in all his dealings with others. He at once took a high place in the Senate, and as a member of foreign relations committee, exerted a strong influence .

Inauguration. Not since the second inauguration of Abraham Lincoln has the country witnessed so simple and so impressive an inaugural ceremony as that on March 4, 1921. In his inaugural address the President rejected the League of Na-

tions; but expressed readiness to join an association of nations for conference and counsel on suggestions for the preservation of peace and promoting the welfare of the world.

ADMINISTRATION. The leaders of the campaign for President Harding had promised that men of large capacity and wide experience would be chosen for the Cabinet, and so far as it was possible, the promise was kept. As Secretary of State a statesman was chosen — Charles E. Hughes; as Secretary of the Treasury, a financier—Andrew W. Mellon. Herbert Hoover, whose organizing ability and energy had been proven on numerous occasions during the World War, was made Secretary of Commerce. One of the chief items in the President's programme was retrenchment in national expenditure, and in order that retrenchment might be swift and as thorough as possible, a Budget Bureau was created. Charles G. Dawes, who had been general purchasing agent of the American Expeditionary Force, was chosen as director of the budget. The President's insistence on the need of retrenchment led to his opposition—consistently maintained —to a cash bonus for ex-service men. He also insisted on the necessity of repealing excess profits taxes and on reducing transportation taxes and income surtaxes.

From the outset, the President displayed independence in resisting political pressure; and also stated that he had no desire whatever to extend the powers or responsibilities of the executive, which, he said, were already too great.

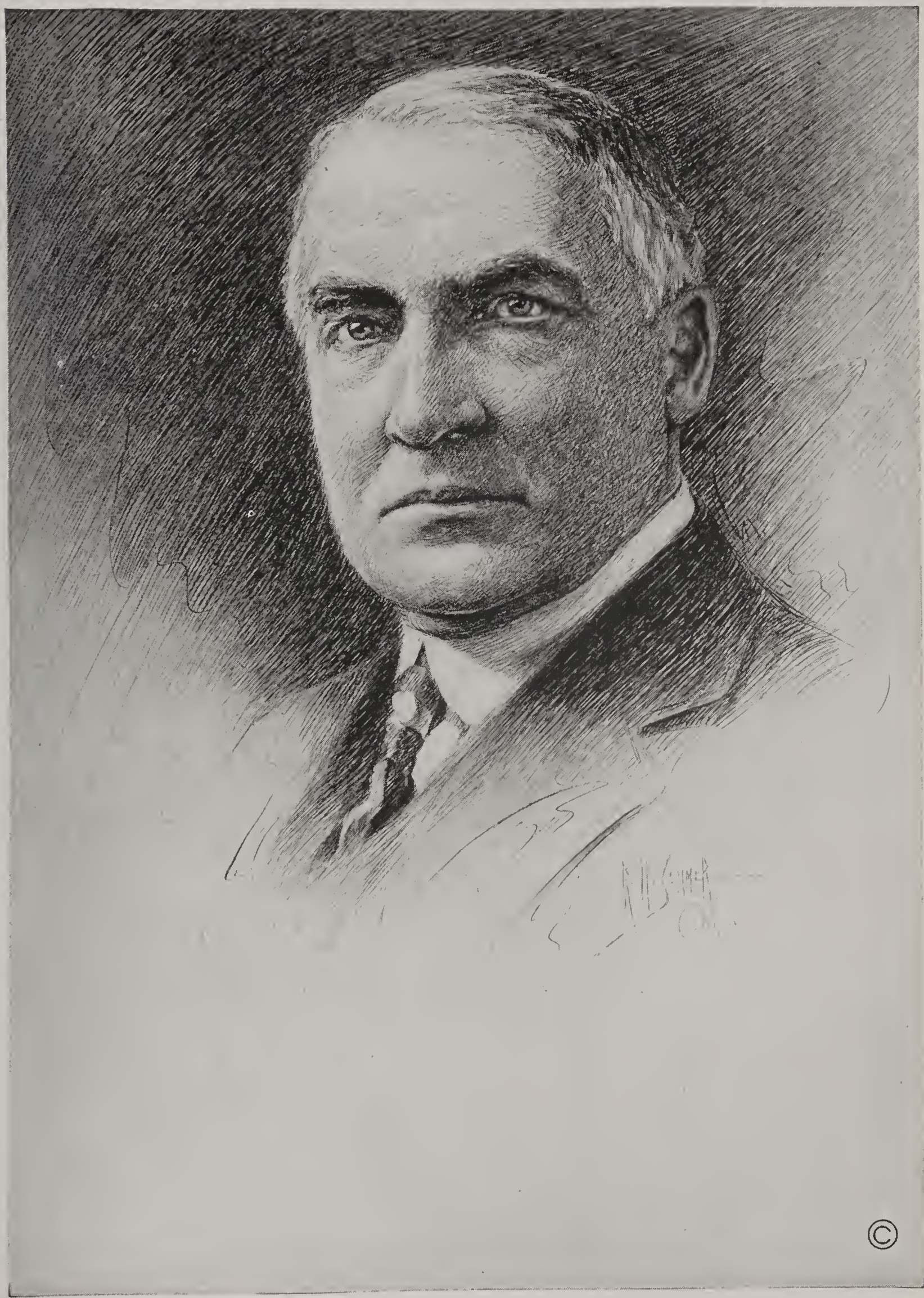
The claims of the nation's agriculturists from the beginning of his administration had a large share of President Harding's attention. In his first message to Congress he asked for protection for the agricultural elements, but declared in his second that not only protection, but active aid as well, was needed; and he always was a fervent advocate of cooperative marketing plans for the farmers. He took a moderate attitude on domestic legislation; urged the close cooperation of Congress with the executive; and left administrative power in the hands of his Cabinet.

In his first message the President made a plain statement regarding the attitude of the United States toward the League of Nations, saying that the country would not, could not, enter the League; but in order that the United States should not become too isolated, the President indicated that invitations to inter-allied conferences would be accepted. A treaty with Germany was signed in August 1921; almost all of the stipulations of the Treaty of Versailles were included, but adherence to any clause referring to the League was emphatically repudiated.

An invitation sent by the United States to the principal nations of the world to a conference on the limitation of naval armament was one of the most important features of the administration. At this conference the President made a proposal for a ten year "naval holiday" and for the scrapping of ships by the principal sea powers. See CONVENTION ON LIMITATION OF ARMAMENT.

Throughout his administration the President preached a "gospel of understanding" when dealing with both domestic and international questions. This resulted in the nation's being a source of invaluable aid to struggling Europe, and worked powerfully for the removal of a large amount of the ill feeling between capital and labor that resulted in the strikes of 1921 and 1922, affecting several of America's key industries. He vetoed the soldiers' bonus bill, a popular measure of the 67th Congress. The President, however, consistently, but with continued good feeling, resisted all attempts by other powers to entangle the United States in the general European quarrel. He advocated the United States joining the Court of International Justice and made this issue the subject of one of his addresses on his way to Alaska.

On June 20, 1923, President Harding with a distinguished party left Washington on a trip to the Pacific Coast and Alaska, intending to return through the Panama Canal. Soon after leaving Seattle on the return trip the President fell ill. He was in a weakened condition from the strenuous exertion of the long journey. While apparently well and on the way to recovery, he died suddenly in San Francisco, August 2, from cerebral apoplexy.



WARREN G. HARDING

Hardness, the quality of a solid substance which enables it to scratch or resist being scratched by another substance. For instance, glass will scratch copper, therefore it is harder than copper. The degree of hardness of iron, steel and some other substances is affected by heating and cooling them (See ANNEALING). Talc is the softest and diamond the hardest substance. In the following table the substances are arranged in the order of their hardness.

1. Talc	6. Feldspar
2. Gypsum	7. Quartz
3. Calcite	8. Topaz
4. Fluorpor	9. Sapphire
5. Apatite	10. Diamond

Hardy, Thomas (1840-), an English novelist. He was born in Dorsetshire. He studied architecture and practiced his profession for some years, but since 1873 has devoted his time to literature. Among his best known novels may be mentioned *Far from the Madding Crowd, The Return of the Native, Two on a Tower, Tess of the D'Urbervilles, The Three Wayfarers,* and *Under the Greenwood Tree.* Hardy is recognized as one of the foremost of living English novelists.

Hare, a family of gnawing quadrupeds. There are about thirty species, widely distributed throughout the grand divisions. The family includes the common hare of Europe and a number of American species popularly known as rabbits. The hare is a comparatively tall animal depending on fleetness of foot to escape from its enemies. It breeds usually in a nest formed in a tuft of grass or under a bush, and lined with its own fur. The nest or form of the hare, as it is called, is not infrequently covered with a blanket of this loose fur under which the young are hid carefully during the mother's absence for food. When pursued until they are wearied some species do take refuge in hollow logs, brush piles, and even in burrows; but, if in burrows, in those of some other animal. The hare has no ability in excavating protective burrows of its own. All members of the family feed exclusively on vegetable food, grass, twigs, clover, lettuce, cabbage, and the bark of many trees, especially poplars and orchard trees. By referring to an article on the RABBIT the reader may see that there is a decided difference between the hare and the rabbit. All our American species are hares; but they have been known as rabbits so long that it seems useless to try to correct the mistake. The European hare is a valuable game animal. Though hunted persistently with gun and dog it succeeds in living in copses and hedges even in the thickly populated farming districts of Great Britain. A favorite method of taking the hare is that of hanging snares or loops in hedge gaps through which it is accustomed to pass.

In North America there are several species. Two yellowish brown species, known as the marsh hare and the water hare, are found in swamps and canebrakes from the Ohio Valley to the Gulf. These hares depend less on their ears and legs than their dry ground relatives, and frequently protect themselves by hiding in the water like a rat. The Arctic hare is found in polar regions. Its fur becomes pure white in winter. The white rabbit or northern hare is found in the northern part of the United States and northward. It is cinnamon brown in summer, becoming white at the surface in the winter time. The jackrabbit or prairie hare is an animal of the western plains. Its fur is yellowish gray in summer; in winter, white at the surface and base, with a yellowish tinge in the middle. It has a comparatively long tail and is the largest hare in North America, attaining a length of twenty-three inches. It is native to the great plains of the West, but is extending its range eastward across the Mississippi. It was such a pest in some portions of the West that the early fruit raisers and farmers found it necessary to organize for its destruction. Jackrabbit hunts were arranged. Men and dogs surrounded an enormous extent of territory and drove the rabbits by a pre-arranged plan into huge pockets or nets of woven wire. As many as 10,000 or even 20,000 animals have been slaughtered in a single day.

The gray or wood rabbit, known familiarly as the cotton-tail,—the "Brer Rabbit" of Uncle Remus,—is also a hare, and is abundant throughout the United States. It is pretty well adapted to the life it leads. The farther south it lives and the less

snow, the more nearly its winter color is that of dead leaves; the farther to the north and the more snow, the whiter its outer fur becomes. Its long ears enable it to hear the approach of enemies. Its strong crooked hind legs enable it to jump far and fast. Its food is abundant. If it were not for the dog, the prowling lynx, and other enemies, the rabbit's life would be free from care. Its track in newly made snow is interesting. A little examination shows that the front tracks are made by the hind legs, which swing around the others before they strike the surface. See RABBIT.

Harebell. See BELLFLOWER.

Harem. See TURKEY.

Hargreaves, här'grēvz, **James,** an English inventor, a native of Stanhill. Hargreaves was an illiterate spinner, working, as was the custom, in his own house. In 1760 he devised a carding machine, and four years later he thought out the "spinning jenny." He had tried frequently to produce more than one thread at a time by paying out between each two fingers of his left hand; but he could not wind the threads on horizontal spindles. The story runs that one of his children upset his wheel while he was spinning at full speed, and that this gave him the notion of vertical spindles. At all events Hargreaves devised a wheel with several vertical spindles. He spun eight threads at a time. This enabled himself and family to produce more yarn than his neighbors. In jealousy and alarm lest the device reduce the number of persons who could have employment they broke into his house and destroyed the frame. It is not pleasant to know that Hargreaves was defrauded of personal benefit from a patent on his invention. He was able to form a small partnership in spinning, however, and died in 1778 in moderate circumstances, but above poverty. See SPINNING.

Harlan, John Marshall, (1833-1911), an American jurist. He was born in Boyle County, Kentucky, was graduated from Centre College, Kentucky, studied law in Transylvania University, and began to practice in Frankfort in 1853. He became county judge in 1858. He served as Union officer in the Civil War and was attorney-general of Kentucky from 1863 to 1867. In 1877 he was appointed associate justice of the United States Supreme Court and has served with distinction for an unusually long period, having entered upon his thirty-fourth year of service in 1911; his term thus equaling in length those of Marshall, Storey, and Field. He sat in the Bering Sea Tribunal which met in Paris in 1893. He supported the constitutionality of the income-tax clause of the Wilson Tariff Bill.

Harland, Marion. See TERHUNE, MRS. MARY V. HAWES.

Harlequin, här'lĕ-kĭn or kwin, the leading character in a pantomime or other comic performance. The word is of doubtful origin, but is probably from the old French Hellequin, the name of a demon figuring in certain medieval legends. Harlequin or Arlecchino was a popular figure in improvised Italian comedy during the fifteenth century. He seems to have united extravagant buffoonery with great bodily agility, somewhat after the manner of the modern clown. He wore a coat of many gay colors, and appeared with shaven head, masked face, and bare feet. He carried a sword of lath. With characteristic variations, Harlequin appeared on the French stage. The German Hanswurst and the Dutch Pickelhering were influenced by this character from the Italian stage. By the middle of the sixteenth century the character had lost some of its coarser characteristics. Later it was confined to the ballet, and finally disappeared from the regular stage. Harlequin had, however, become popular in the English Christmas pantomime. This species of entertainment was often called a harlequinade and consisted of two parts, an introduction and the dumb show or pantomime. In this, four characters were the important performers,—Harlequin and Columbine, who are lovers, Clown and Pantaloon. Clown is a comic villain who attempts the capture of Columbine, aided by Pantaloon, a silly old man,—the butt of all the other performers. Columbine is a well trained dancer, whose beauty of face and costume are special features of the play. Harlequin, however, is the most important character. He is dressed in a tight costume of bright colors covered with spangles, and carries a magic wand with which he foils all the knavish tricks of the Clown, to whom

he is supposed to be invisible. Fairies appear in the pantomime and sometimes other characters. All ends merrily. The harlequinade was introduced to the British stage in 1702 by a Shrewsbury dancing master.

Harlequin, in the various characters to which that name has been given, may seem to have offered little to an ambitious actor. Nevertheless, lasting reputations have been made by more than one skillful actor in this role. The names of John Rich, Woodward, O'Brien, and Grimaldi among Englishmen, and of the famous French Carlin, will be remembered as having devoted real genius to the presentment of the character of Harlequin.

Harmon, Judson (1846-), an American statesman. He was born at Newton, Ohio, the son of a Baptist minister. He was graduated from Denison University, Ohio, and took the degree of LL. B. at the Cincinnati Law School in 1869, since which time he has been very active in public life. Twice he held different judicial positions, in both of which William H. Taft, later president of the United States, succeeded him. When Mr. Taft became solicitor-general of the United States, Mr. Harmon followed him to Washington as attorney-general in the cabinet of President Cleveland. Oddly enough Mr. Taft later accepted a cabinet position under Mr. Roosevelt as secretary of war. In 1896 Mr. Harmon was made professor of law in the University of Cincinnati. He has acted as receiver for several great railroad properties, showing remarkable business ability in bringing order out of their chaos. In 1909 he was elected to the governorship of Ohio on the Democratic ticket; and in 1912 he was an unsuccessful candidate for the Democratic nomination for the presidency.

Harmonia, in Greek legend, the daughter of Ares and Aphrodite. Though of immortal parentage Harmonia was born to trouble. Her mother was the wife of Hephaestus (Vulcan), given to him by Zeus himself, and she naturally enough incurred the displeasure of the artist god by the favoritism of Ares. Hephaestus chose to be avenged upon the innocent daughter. He was very cunning, however, and hid his evil designs in beautiful gifts. Harmonia was married to King Cadmus of Thebes. All the gods left Olympus to attend the wedding. Among the gifts, Hephaestus placed a brilliant necklace and a robe of beautiful coloring. The necklace was a gift which brought death to every mortal into whose possession it came. The robe or peplus was dyed in crimes and was destined to lead the children of Harmonia into wickedness and impiety. Moreover, Harmonia's husband, Cadmus, was under the displeasure of the gods on account of his having killed the sacred serpent of Mars. The couple endured great misfortunes and much unhappiness on account of their children. Finally, the god took pity on them, since neither merited such trouble, and transformed them into serpents. See SEVEN AGAINST THEBES; VULCAN; CADMUS.

Harmonics, the attendant sounds accompanying the main tone produced by a vibrating body. If a string vibrates as a whole, the tone produced, the lowest of which it is capable, is called its fundamental. If it vibrates in halves, the octave with twice the vibration is produced, called the first overtone or harmonic; if in thirds, the fifth with three times the vibration gives the second harmonic, and so on. Combinations of these overtones with their fundamental, determine the quality of a musical sound, the difference in the same note produced upon the various musical instruments.

Harmonic Motion, the apparent motion of a body moving in a circle with uniform velocity when viewed from a distance in the plane of its orbit. The satellites of Jupiter as seen from the earth have such a motion. The vibration of a tuning fork, a piano wire, or a pendulum is approximately simple harmonic. The complete time of a to and fro motion is known as a period; the extreme distance from the center is called the amplitude; the word phase is applied to the fraction of the whole period elapsing since the body has passed through the middle point in the positive direction.

Harmony. See MUSIC.

Harmsworth, Alfred Charles William. See NORTHCLIFFE, LORD.

Harold, surnamed Haarfager, or "The Fair-haired," a noted king of Norway. He

died at Trondjhem, the residence and burial place of kings, in 933. He carried on the work in Norway that the Capets accomplished in France. He suppressed brigandage and piracy. He subjected the petty jarls or princes to the authority of the crown, taking two-thirds of their prior incomes for the national treasury. Rather than submit to national authority many jarls migrated with their followers and colonized Iceland, the Faroes, the Shetlands, and the Orkneys. Harold found it necessary to visit the Orkneys with a fleet and to chastise the colonists before they would give over plundering the mother country. The settlement of Hrolf or Rollo and his Viking band in France was a part of this migration of the fiercely discontent. Christianity had not taken root as yet in Norway, and the "tyranny" of Harold, was wholly temporal, not spiritual.

Harold II (1022-1066), king of England. He was the second son of Godwin, Earl of Essex. About 1064 he was shipwrecked on the coast of Normandy, where he fell into the power of William, Duke of Normandy. Under compulsion he promised to marry the daughter of William and to assist the latter in attaining the throne of England at the death of the reigning king. On being set at liberty Harold returned to England. He chose to forget his promises to William. He married to suit his own views, and, on the death of King Edward, procured his own election to the throne. While absent in the north, where he overthrew his brother Tostig who was making trouble, he heard that William had landed on the southern coast of England. Harold hastened southward with his army. The English forces met the Normans near Hastings, October 14, 1066. Harold, with most of his nobles, was slain. William, thenceforward known as the Conqueror, seized the throne of England. Harold was buried on the coast near the scene of battle. His grave was marked by a heap of stones. The scene of *Harold, the Last of the Saxon Kings,* written by Bulwer-Lytton, is laid in the reign of Harold. It is an excellent historical romance. See WILLIAM THE CONQUEROR; HASTINGS; BAYEUX TAPESTRY.

Harp, a stringed musical instrument played by plucking with the fingers. The invention of the harp is ascribed to the Egyptians from whom the Hebrews, no doubt, derived it. David, the sweet psalmist of Israel, played the harp to drive away the evil spirits that plagued King Saul. The harp was long the instrument of minstrelsy and was given the place of honor at court and at feasts. Scott's *Lay of the Last Minstrel* is a spirited portrayal of the manners prevailing at the close of the Border Minstrelsy. The old minstrel, forgetful of toil and want, tuned his harp

> Till every spring's according glee
> Was blended into harmony . . .
> And lighted up his fading eye
> With all a poet's ecstacy.
> In varying cadence soft or strong
> He swept the sounding chords along. . . .
> Each blank in faithless memory void
> The poet's glowing thought supplied.
> And while his harp responsive rung,
> 'Twas thus the Latest Minstrel sung.

The harp of Erin divides with the shamrock the honor of being the national emblem of Ireland. The early harp had from four to eleven strings. The Hebrews gave it its graceful shape. The modern harp, used with fine effect in orchestras, has forty-six strings. By an invention, brought to perfection about 1808 through the efforts of a musician named Erard, the heel is furnished with seven pedals, each of which may be depressed two notches. Depressing the first pedal, for instance, one notch shortens all the F strings by so much as is necessary to raise their notes a semitone. Depressing the F pedal again shortens the F strings and raises their notes another semitone. The pedals are depressed or released by the toe of the player. See AEOLIAN HARP.

Harper, William Rainey (1856-1906), the first president of Chicago University. He was born at New Concord, Ohio, July 26, 1856. He died in 1906. He was a remarkably precocious student. He was graduated at the early age of fourteen at Muskingum College. He held various educational positions, including the professorship of Hebrew in Union Theological Seminary, Chicago, and of Semitic languages and Biblical literature in Yale. In connection with his professorships, he edited various Hebrew publications and did noted work in Biblical criticism. In 1891 he

was chosen president of Chicago University. He took charge of a stretch of open prairie. He left over thirty well designed buildings. He assembled faculties noted for scholarship and organization—the third largest university in North America. John D. Rockefeller furnished most of the money. William R. Harper supplied the ideas or else hunted up men who could furnish them. By general consent he is ranked as one of the leading college presidents.

Harper's Ferry, a town of West Virginia. It is situated at the junction of the Shenandoah and Potomac, at very nearly the extreme eastern point of the state. It is fifty-five miles northwest of Washington with which it is connected by the Baltimore and Ohio railroad. The Potomac breaks through the Blue Ridge at this point. The site is one of the most picturesque in America. A United States arsenal was established here in 1796. For this reason John Brown chose Harper's Ferry as a base of operations in his attempt to free the slaves of the South. During the Civil War Harper's Ferry was considered a position of strategical importance and changed hands repeatedly. In September, 1862, the Confederate general, Jackson, captured the post, taking 12,500 prisoners, 13,000 small arms, 200 wagons, and a vast quantity of military stores and provisions. See JOHN BROWN; WEST VIRGINIA; POTOMAC.

Harpoon. See WHALE.

Harpsichord, a stringed musical instrument in use before the invention of the piano. The modern piano was developed from it. The strings are mounted in a frame like that of a grand piano, and are played by means of keys. Instead of striking the string with a hammer, the key of the harpsichord plucked the string by means of a leather or quill point. The player had no control over the loudness of tone, although a double keyboard was sometimes used, one for soft, the other for loud effects. As compared with a piano the tones were characterless and tinkling. It held its own up to the beginning of the nineteenth century. In colonial days the harpsichord was found in every well furnished parlor. It was used to accompany singing and in providing music for the stately minuet, then in fashion. The harpsichord of the Washington mansion is still preserved at Mt. Vernon. See PIANO.

Harpy, här′pȳ, a fabulous creature of Greek mythology. It had the body, legs, and talons of a vulture and the head and breast of a woman. The harpies are described as hideously fierce and filthy, with the habit of swooping down upon an outdoor feast, devouring the choicest viands, and defiling everything they could not eat. A descent of this sort is depicted in Virgil's *Aeneid*. Aeneas and his followers, after leaving Crete for Hesperia, make their first landing on the Strophades, the island of the harpies. They prepare a feast, having slain wild cattle for that purpose. They invoke the blessing of the gods and begin their feast,

When from the mountain-tops, with hideous cry,
And clatt'ring wings the hungry Harpies fly.

The feast is defiled. Aeneas orders new meats to be prepared, but with the same result. This time they do battle with the harpies. While it is impossible to kill them they are at last driven away, but one Celaeno seats herself upon a "craggy cliff," curses Aeneas, and prophesies dire famine and other dread misfortune in Italy, foretelling that the Trojans will be reduced to such hunger that they will consume the very plates in their distress. Virgil tells in the seventh book of the *Aeneid* how this prophecy was fulfilled when the hungry men used pieces of bread for plates and then devoured the bread.

Ascanius this observ'd, and smiling said,
See! we devour the plates on which we fed.

Harquebus. See ARQUEBUS.

Harriman, Edward Henry (1848-1909), an American railroad magnate and multi-millionaire. He was the son of a poorly paid Episcopal rector, and was born in the parsonage at Hemsted, Long Island. He had a year or two of instruction in a parochial school. At sixteen he became an office boy in a brokerage house on Broadway; at eighteen he was a confidential clerk; at twenty-two he bought a seat on the New York Stock Exchange for $20,000. No one knows how he got the money, but he became one of the shrewdest buyers and sellers of railroad shares known on the New York Exchange. At twenty-five he mar-

ried the daughter of a wealthy banker; at forty he was worth a million and was a leading spirit in the Illinois Central, bent not so much on money, it is said, as power in the railroad world. His plan of financiering was, in brief, to buy up a road cheap and then sell bonds for more than the road cost him. In this way, he not only acquired large holdings at no cost to himself, but made a profit besides.

At sixty Mr. Harriman's ambition was realized. He was the most powerful railroad man in the world. At sixty-one, at the time of his death, Mr. Harriman controlled nearly 75,000 miles of railway, enough to girdle the earth three times. These lines were

	Miles.
Union Pacific	5,916
Southern Pacific	9,731
Illinois Central	4,278
New York Central	12,282
Atchison	9,350
St. Louis & San Francisco	6,356
St. Paul	8,687
Chicago & Northwestern	7,632
Baltimore & Ohio	4,446
Delaware & Hudson	845
Georgia Central	1,914
Wheeling & Lake Erie	442
Erie Railroad	2,333
Total	74,212

The stockholders in these systems were rated by the *Journal of Commerce* at 80,000 and the number of employes at 350,000. To indicate the power wielded by this railway president, it may be sufficient to state that the Harriman lines extended from New York *via* Buffalo, Pittsburg, Chicago, Kansas City, Denver, and Salt Lake City to San Francisco; from New Orleans *via* El Paso, Los Angeles and San Francisco to Portland, and from Chicago to New Orleans. Other lines and branches brought Montreal, Quebec, Baltimore, Cincinnati, Cleveland, St. Louis, Omaha, Galveston, Milwaukee, St. Paul, Minneapolis, —in short nearly every American city of commercial importance within his netway of rails. A line of Harriman steamers connected New York, Havana, New Orleans, and Galveston. Another line brought oriental freight to the San Francisco terminals.

Mr. Harriman's life was strenuous and was confined chiefly to railroad matters. One of the pleasant incidents in his life was the organization of what has been called the Harriman-Alaska Expedition. In 1899 he chartered a ship and organized an excursion party to visit Alaska. The party consisted of his own family, several invited guests, and about fifty representative gentlemen interested in science and art. Among the men of note were William Trelease of St. Louis; John Muir of California; John Burroughs of New York; and Messrs. Gannet, Merriam, Ridgway, Gilbert, and Colville from various departments at Washington. The fauna, flora, geology, and geography of the region were studied. Among the animals new to science were two foxes, five hares, and a number of marine forms. The experts united in getting out an illustrated report of the expedition. Mr. Harriman's name was bestowed on a fiord and a glacier.

There are countries where Mr. Harriman would never have been heard of, save as an unscrupulous gambler in stocks. But the American system of private ownership and operation of the highways of commerce made possible that extraordinary Harriman decade which has culminated so dramatically in his recent return from Europe to die, with the entire financial world feverishly awaiting the bulletins from the sick man's chamber. . . .

Down to the fiftieth year of Harriman's life, he was utterly enveloped in an atmosphere of the most sordid money-getting by the most unscrupulous methods that would endure the scrutiny of the criminal courts. It is absurd to suppose that the stream of ethical motive can rise higher than its source; and we must judge Mr. Harriman to have been guided throughout his business career by those motives of self-interest which have been universal in the business world. He was reared to the methods of tooth and claw, and none surpassed him in the genius for battle, as many who saw at close range the tremendous contest between the Hill and Harriman forces, in 1901, for the control of the Northern Pacific, when the stock of the road rose to $1,000 a share, will long remember. To an enemy or a competitor Mr. Harriman was as merciless as he was formidable, and they say he had no friends in the entire business community who could fan into life a spark of real affection for the man. The most powerful bankers and capitalists placed their hundreds of millions absolutely at his disposal, in order that he might finance his schemes and win his battles, because they had the utmost faith in his genius to make their investments yield solid profits. Napoleonic, one would say, was the man—that is, a perfect master of the conditions that he confronted, so long as he could deal with them in his own way. Unmoral he was, if not immoral, and the end was everything, the means nothing to his restless and boundless ambition for achievement and aggrandizement.

It may be suspected that in those last years he got glimpses of the American people that told him a new era was in the dawning. It will be an era in which men of his type will shrivel and disappear, since the public interest is in the future to dominate the field of natural monopoly rather than private gain.—*Springfield Republican.*

Harris, Joel Chandler (1848-1908), an American journalist and author. He was born at Eatonton, Georgia, and lived on a plantation until the close of the war. After serving as a printer's apprentice he obtained a position on the staff of the Savannah *Daily News.* In 1890 he became editor of the *Atlanta Constitution,* in which periodical his Uncle Remus sketches first saw the light of day. Among his writings in book form are *The Folk-Lore of the Old Plantation, Nights with Uncle Remus, Balaam and his Master, Minerva Ann, Uncle Remus, his Songs and his Sayings.* Mr. Harris possesses a remarkable sympathy not only with human life, but also with animals. His familiarity with the negroes during the life on the plantation, coupled with this sympathy, made possible his creation of "Uncle Remus," of "Brer Fox," and "Brer Rabbit," which have delighted young and old for a quarter of a century.

Harris, Joseph (1828-1892), an agricultural author. Born in the village of Shawbury, England. He took part in the famous Rothamsted agricultural experiments. Coming to this country in 1849, he wrote *Walks and Talks* for the *Genesee Farmer* and for the *American Agriculturalist.* He advocated high farming—bringing the whole farm into the condition of a garden. Manure, tilth, and freedom from weeds were his doctrines. He wrote *Harris on the Pig, Talks on Manures,* and other practical works. It is to such plain thinkers as Mr. Harris that our present extension of agricultural science and education is due.

Harris, William Torrey (1835-1909), an American educator. He was born at North Killingly, Connecticut. He attended Yale College but was not graduated. He taught in the St. Louis schools 1857-67, and was superintendent of schools in that city 1867-1880. He was United States Commissioner of Education 1889-1907. Mr. Harris is known as a metaphysical writer. He founded the *Journal of Speculative Philosophy* in 1867. He was one of the organizers of the Concord school of philosophy. As an author, he wrote *Hegel's Logic: a Critical Exposition, The Spiritual Sense of Dante's Divina Commedia, Introduction to the Study of Philosophy,* and *Psychologic Foundations of Education.* Mr. Harris' writings were by no means clear to the layman; but their very ponderosity and the kindly, simple manner of Mr. Harris himself, did much to fasten upon the American teacher an exaggerated notion of the importance of psychology in the working outfit of the teacher.

Harrisburg, made the capital of Pennsylvania in 1812, is beautifully situated on the Susquehanna River. The city was named for a settler, John Harris, who came there in 1726. About twenty-five years later his son established a ferry across the Susquehanna at this point, where now are five great bridges. The state buildings are very prominent; the largest of these is the costly capitol, done in marble and granite from American quarries and placed in a park of more than fifteen acres. In one of them is the large state library; the State Hospital for the Insane is also located in Harrisburg. It is the site of a large Roman Catholic cathedral, being a bishop's see of that church. There are over eighty other church edifices and a large Y. M. C. A. building. The proximity of the city to great iron and coal mines has led naturally to extensive iron and steel manufacture; there is also an important trade in lumber. Several railroads enter the city, and there are two local electric as well as interurban lines. In 1920 the population was 75,917.

Harrison, Benjamin (1833-1901), the twenty-third president of the United States. He was born at North Bend, Ohio, August 20, 1833, and died at Indianapolis, Indiana, March 13, 1901. He was the grandson of President William Henry Harrison. He was graduated at Miami University in 1852, and took up the practice of law in Indianapolis. In 1862 he entered the Union army as a colonel. His career was honorable and courageous. He retired with the rank of brigadier-general and resumed the practice of law. In 1876 he was nom-

inated by the Republicans for governor, but was defeated at the polls. He sat in the United States Senate from 1881 to 1887. In 1888 he was nominated by the Republicans for the presidency, and defeated President Cleveland, who was a candidate for reëlection. The principal issue of the campaign was protection. In the organization of a cabinet, Blaine was made secretary of state, Windom, secretary of the treasury, and Wanamaker, postmaster general. The McKinley tariff bill and the Sherman silver act were enacted during his administration. In 1892 Harrison was renominated for the presidency, the rival candidate being Blaine, who had resigned from the cabinet to make the contest. High tariff again formed the issue. Harrison was defeated by Cleveland. He returned to Indianapolis and resumed the practice of law. He was invited to deliver lectures on international law by Leland Stanford University. He acted as the attorney for Venezuela in a boundary dispute with Great Britain. He was one of the representatives of the United States at the Hague Peace Conference, and was appointed by President McKinley as the member for the United States at the international court of arbitration. His reputation is that of a scholarly, honorable man of moderate ability and political success.

Harrison, William Henry (1773-1841), the ninth president of the United States. He was a native of Virginia and was the son of Benjamin Harrison, a signer of the Declaration of Independence. In 1794 he served in the army of Anthony Wayne and was present at the famous victory of that leader over the Indians at Maumee Rapids. When the Northwest Territory was organized Harrison was made secretary, and in 1799 he represented it in Congress. In 1800 he was appointed governor of the newly formed territory of Indiana. He was still governor when the famous outbreak of Tecumseh and his brother, the Prophet, took place. He led the troops against the Indians, gaining the victory of Tippecanoe, November 7, 1811. The epithet of "Tippecanoe" stayed by him through life. In the War of 1812 he was made a major-general and took part in the operations in the West. He added to his military renown by defeating the British Proctor and Tecumseh at the battle of the Thames.

From 1816 to 1819 he was in Congress. He was promoted to the Senate and served as minister to the United States of Colombia. In 1836 he was nominated by the Whigs for president, but was defeated by Van Buren. In 1839 he was again nominated. The campaign of 1840 was one of the most remarkable in the history of American politics. Harrison's opponents undertook to belittle him as a man who lived in a log cabin and drank hard cider. His supporters took up the issue. A log cabin carried on the shoulders of men, and followed by a cheering crowd, was a prominent feature of the political rally. "Tippecanoe and Tyler, too," was the slogan. The Whigs swept the West like a whirlwind, fairly shouting and singing their candidates into the White House. Harrison organized his cabinet with Daniel Webster as secretary of state. The fatigue and exposure of the campaign, together with the weariness arising from the importunities of office seekers, incident to the coming of the Whigs into power for the first time, proved too much for the president. He died at the end of a month of service.

Harrison, N. J., an industrial city, is on the Passaic River. Three railroads enter, and it is connected with Newark by three steel bridges. The principal manufactures are wire cloth, marine engines, steel, pumps, refrigerators, shoes and leather. It contains a sub-station of the Newark post office, but has an independent municipal government. The water works are owned and operated by the city. Population, in 1920, 15,721.

Hart, Albert Bushnell (1854-), an American professor, editor, and historian, who, by stressing the necessity of original research has established in the United States a new method of studying modern history. He was born at Clarksville, Pa., and was graduated from Harvard University in 1880. After receiving a degree at Frieburg University, Germany, in 1883, Dr. Hart returned to the United States and became instructor in American history at Harvard. In 1910 he was appointed professor of government at Harvard.

From 1894 to 1902 Dr. Hart was associate editor of the *Harvard Graduates' Magazine*, and from 1895 to 1909 one of the editors of the *American Historical Review*. He has also edited several series on American history and government, including *The American Nation, a History, American Citizen Series,* and others. His most important historical works are *Actual Government, Manual of American History, Diplomacy and Government, The War in Europe, Formation of the Union, The Monroe Doctrine* and *America at War.*

Harte, Francis Bret (1839-1902), a noted American writer. He was born at Albany, New York, August 25, 1839, and died at Aldershot, England, May 5, 1902. During the gold excitement of 1854 he went to California. He taught school at Sonora and spent his small savings in mining, in which, however, he failed utterly. In 1857 he found work as a compositor in the office of the San Francisco *Golden Era.* Short sketches written for that paper began to attract attention. In 1864 he obtained an appointment in the branch mint at San Francisco. Four years later he was invited to become editor of the *Overland Monthly. The Luck of Roaring Camp* appeared in its pages and it made him famous. In 1871 he returned to New York City and wrote regularly for the *Atlantic Monthly.* In 1878 he was appointed consul at Crefeld, Germany, and two years later he was transferred to the consulate of Glasgow, Scotland. In 1885 he settled at London, where he continued to write stories of Western life.

He was the first American writer to seize upon the picturesque features of California. Miners, stage drivers, gamblers, road agents, and boarding-house keepers, the mountains, gulches, torrents, fords, and dust of California, and the shifting scenes of mining camps, were introduced into literature for the first time. Some of his celebrated short stories are *The Outcasts of Poker Flat, The Twins of Table Mountain, M'liss,* and *A Protégé of Jack Hamlin's.* Among his longer stories and novels are *Gabriel Conroy, Snowbound at Eagle's, Colonel Starbottle's Client,* etc. He wrote also several volumes of verse, including *Echoes of the Foothills.* Ah Sin, the heathen Chinee, "with the smile that was child-like and bland," is one of his creations.

Opinions of Harte's work vary. His writings deal necessarily with vice. The most of his characters, however, have a touch of human nature, ascribed by some to the sweetness and charity of the writer's nature, and by others to a propensity on his part to surround the daring and the picturesque with a sort of halo. His future is far from certain, but he will never be classed among the writers of yellow backed literature.

Hartford, the capital city of Connecticut. It is situated on the Connecticut River, at the head of navigation. The first white settlement on its site was made by the Dutch in 1633, but in 1636 a company of one hundred people from Massachusetts, led by the Reverends Thomas Hooker and Samuel Stone, settled at Hartford, Wethersfield, and Windsor. In 1637 a number of settlers were killed by the Pequots, and in May of that same year, John Mason's celebrated expedition against the Pequots started from Hartford. It was here that Andros endeavored to seize the charter of Connecticut. In 1701 Hartford became the joint capital with New Haven. In 1873 it became the sole capital of the state. Early in its history the city had an extensive trade with the West Indies. Out of insurance against disaster at sea has grown up a large marine and fire insurance business. There are six life insurance companies, making Hartford one of the insurance centers of the world. There are extensive manufactures. The Gatling gun and the Colt revolver are made here. Hartford is headquarters for the manufacture of bicycles and typewriters. It is a leading city in the production of steam engines, boilers, leather belting, knit goods, carriages, harness, and electric machinery. The city is well built. Its streets and parks are shaded with beautiful elms. Trinity College is a prosperous institution. The various libraries of the city contain more than 327,000 bound volumes, and thousands of pamphlets. The population as reported by the last census was 138,036. For its size, Hartford is one of the richest cities in the Union. The assessed valuation exceeds $1,000 per inhabitant. See CHARTER OAK.

Hartford Convention, an official gathering of New England Federalists, held at Hartford, Connecticut, December 15, 1814-January 5, 1815. Twenty-six delegates were present: twelve from Massachusetts, seven from Connecticut, four from Rhode Island, two from New Hampshire, and one from Vermont. A secret session was held for three weeks. The convention was called because it was believed that New England was not receiving fair treatment at the hands of the general government. The New England Federalists opposed the War of 1812. Massachusetts and Connecticut refused to place their militia under the orders of President Madison. An embargo was placed on shipping, that is to say, all ships were forbidden to leave port. The Federalists maintained that the war was ruining the commerce of New England, and that it was carried on entirely in the interest of the West and South. Resolutions were adopted reciting grievances and calling for a number of reforms. The supporters of the president and of the war charged the convention with treasonable intentions. A suspicion was even afloat that the leaders were in traitorous correspondence with the English with a view to the creation of a New England duchy with an English nobleman for its duke. Ere the resolutions of the convention could be discussed by Congress, the battle of New Orleans had been fought and won by General Jackson and peace had been declared. There was no further occasion of dispute. The records of the convention, since made public, show that the proceedings were exceedingly objectionable. They looked toward treason, should treason become safe.

In view of the subsequent attitude of New England toward the seceding South, the facts of the Hartford Convention should be known better than they are. The meeting was representative and official. The call was issued by the legislature of Massachusetts to concert action, "not repugnant to their obligations to the Union," and "lay the foundation for a radical reform in the national compact." The candid historian, however, cannot doubt that the convention was called for sectional purposes, and that, had the war gone on disastrously and had the demands of the convention been spurned by the Congress, secession would have been the next step in the Federalist program. Whether the party would have lost in the popular elections is another question.

The convention was not a mere gathering of disappointed politicians. The delegates from Massachusetts, Connecticut, and Rhode Island were chosen by the legislatures of these states. The representatives from New Haven and Vermont were sent by Federalist counties. The sessions were deliberate and determined. After a recital of grievances, the report proposed:

1. That the defense of each state be left to the state itself.
2. That Federal taxes should be returned to the states in which they are collected.
3. The abolition of the three-fifths slave representation.
4. The requirement of a two-thirds vote for the admission of a new state.
5. The limitation of embargoes to sixty days.
6. The requirement of a two-thirds vote to sanction an embargo, or to declare war, save in case of invasion.
7. To exclude naturalized foreigners from civil office and a seat in Congress.
8. To make a president ineligible for reelection.

The secret deliberations of the convention cannot be known, but it is significant that the convention closed with a recommendation that, in case the grievances were not redressed and the proposed amendments accepted, another convention be held in Boston in June following. On receiving the recommendations of the convention, the legislatures of Massachusetts and Connecticut sent commissioners to Washington to present the demands agreed upon, but the successful close of the war removed the causes of grievance and discredited the Federalist leaders, driving many of them from public life. In 1819 the formal record of the proceedings of the convention was deposited by the chairman, George Cabot, with the Massachusetts secretary of state.

Hartshorn. See AMMONIA.

Harun-al-Rashid, hä-roon-äl-răsh'id

(789-809), by translation, Aaron the Just, caliph of Bagdad. He was born near Teheran. He was the most renowned of the Arabian caliphs and was, of course, a believer in the doctrines of Mohammed. His empire extended from the Indus to the Nile. He set his government wisely in order from one frontier to the other; he encouraged trade by making the caravan routes secure from robbers; he filled his chests with treasure; built palaces and mosques, and erected inns for the entertainment of travelers. Bagdad, the capital, became the most celebrated seat of learning in the world. Harun assembled learned men, poets, lawyers, rhetoricians, scribes, wits, and musicians from all parts of his extensive domain. Scholars resorted to Bagdad from western Europe, northern Africa, and from Asia. He himself took a personal interest in the various arts and sciences. He is said to have been a poet of no mean order. According to all accounts, he is one of the great men of the world, meriting consideration not only as a student and a patron of learning, but as an administrator and man of action. It is said, on uncertain authority, however, that he and Charlemagne were men of kindred minds, and that they corresponded with each other. He is known best to young readers through the *Arabian Nights*. See ARABIAN NIGHTS; BAGDAD.

Harvard University, the oldest institution of learning in the United States. It is located at Cambridge, Massachusetts, named for the university town of that name in England. It was founded in 1636 by vote of the general court of the colony of Massachusetts Bay. The act carried an appropriation of £400, £200 to be available the next year, and an additional £200 when the proposed building should be erected. Two years later, John Harvard, a dissenting clergyman of England, who had been in the colony about a year, died at Charlestown. He bequeathed his entire library and half of his property to the institution. The money part of his bequest turned out to be worth about £800. It made possible the immediate opening of the college, which was thereupon named in John Harvard's honor.

During most of its existence the growth of Harvard College was gradual; but during the last fifty years it has expanded rapidly in size, has developed the extent and quality of its graduate and professional instruction, and has become a mighty university. Nationally important, and with international influence.

It is governed by two boards: the Corporation (or President and Fellows) consisting of seven men who elect their own successors, hold the property, and appoint the staff; and the Board of Overseers, a group of thirty-two men elected by the graduates, who possess a veto power on the more important acts and appointments of the Corporation.

In addition to the regular college of arts and sciences and the graduate school of arts and sciences, schools of engineering, theology, business, law, medicine, dentistry, public health, education, architecture, landscape architecture and applied biology are maintained. There is also a summer school of arts and sciences and of education.

Radcliffe College, for women, is affiliated with the university and the Harvard Summer School is open to women, but the regular Harvard departments are open to men only, with the exception of the Graduate School of Education.

The productive endowment is approximately $52,000,000, having been greatly augmented by an endowment fund campaign conducted by the graduates in 1919 and 1920. The library contains over 2,000,000 books and pamphlets, the teaching staff numbers over one thousand, and the enrollment in all regular departments exceeds 6,000.

Among the famous graduates of Harvard College have been three Presidents, John Adams, John Quincy Adams, and Theodore Roosevelt; and such men as Emerson, Thoreau, J. R. Lowell, O. W. Holmes, Charles Sumner, Edward Everett, Wendell Phillips, Cotton Mather, Samuel Adams, John Hancock, Francis Parkman, and John Fiske. Another president, R. B. Hayes, was a graduate of the Harvard Law School.

A house in Stratford-on-Avon, built in the sixteenth century by Alderman Thomas

Rogers, the father-in-law of John Harvard, has been purchased for the university by Edward Morris of Chicago. Miss Corelli, the novelist, supervised the restoration of this quaint building to its original form. In the fall of 1909, on the same day as that on which Abbott Lawrence Lowell was installed as president of the university, appropriate exercises were held in this house, dedicating it as a shrine for American tourists. Miss Corelli with an eloquent speech presented Ambassador Whitelaw Reid with the key of the house in a metallic casket. In accepting the key the ambassador said:

"Standing in the home of Harvard's mother, by the authority of Harvard University, I declare this house henceforth open as a free resort for all visiting sons of Harvard and a general rendezvous for all visiting Americans. May it serve that double purpose as long as our race prizes letters and honors Shakespeare."

Harvest Moon, the full moon that occurs nearest the date of the autumnal equinox (see AUTUMN), September 22. Since this is harvest time, the name harvest moon has become general. At this time of year the moon is traveling at the least possible angle with the ecliptic, and rises at about the same time on several successive nights, and shines with unusual brilliance. While the harvest moon has often been the inspiration of poet and painter, it also serves the practical purpose of furnishing the agriculturist with light strong enough to work by at the season when time is precious.

Harvest. See REAPING; WHEAT.

Harvey Birch, the principal figure in Cooper's novel, *The Spy,* published in 1821.

Harvey, Colonel George Brinton (1864-), American Ambassador at the Court of St. James, was born at Peacham, Vermont, and educated at Peacham Academy. Entering upon a career of journalism at the age of 20, Colonel Harvey became managing editor of the New York *World* at 27. Ill health forced him to resign. In 1897 he bought and became editor of the *North American Review,* and in 1898 was elected president of the publishing house of Harper and Brothers, of which he is now the chief owner. He edited Harper's Magazine during 1902-13, and bought the *Metropolitan Magazine* in 1903. Colonel Harvey was lecturer on journalism at Yale University in 1908. He holds honorary degrees from many American universities, and is the author of *Women* and *The Power of Tolerance.* He was appointed ambassador by President Harding in 1921.

Harvey, Horace (1863-), a Canadian jurist who since 1910 has been chief justice of the supreme court of Alberta. He was born in Elgin County, Ontario, and studied at the University of Toronto. Called to the bar in 1889, Mr. Harvey practiced in Toronto for four years, after which he removed to Calgary. He rose rapidly in his profession, and in 1896 was appointed registrar of land titles at Calgary. Four years later Mr. Harvey was chosen deputy attorney general for the Northwest Territories, and in 1904 was appointed judge of the superior court of the Territories. Upon the organization of the province of Alberta in 1905 he was made judge of the supreme court, and was appointed chief justice in 1910.

Harvey, Sir John (1778-1852), a British soldier and a colonial administrator. Entering the army in his youth, he saw service in many parts of the world, and in 1812 was appointed deputy adjutant-general of the English forces in Canada. He was welcomed by Sir George Prevost, who asked his advice as to the best manner of defending the wide Canadian frontier against the forces of the United States. After taking a conspicuous part in several hard battles, Sir John returned to England at the end of the war, and served on Wellington's staff during the Waterloo campaign. He returned to America as Governor of Prince Edward Island in 1836, and from 1837 to 1841 was Governor of New Brunswick. From 1846 until his death Sir John was Governor of Nova Scotia. He was a wise and able administrator, serving faithfuly and gaining popularity when all colonial governors were looked upon as a kind of necessary evil, a view due chiefly to lack of under-

standing of the c nial problem and consequent lack of s pathy with the people.

Harvey, Willi 1 (1578-1657), an English physician. Educated at Cambridge and Padua. He became physician to Bartholomew's Hospital, London, 1602, and later a lecturer on anatomy and surgery. Harvey was court physician to James I and Charles I. Servetus and others had an inkling of the circulation of the blood, and Harvey may have gotten hold of the idea at Padua; but, however that may be, he was the first to demonstrate that the blood is forced by the muscles of the heart out through the arteries to all parts of the body, and that it passes from the arteries through capillaries into the veins and returns to the heart for a similar trip through the lungs and back to the heart ready for the body again. Harvey published this discovery of the circulation of the blood in 1628. See BLOOD.

Harz (härts) **Mountains,** the most northerly range of mountains in Germany. The region is 60 miles by 30 in extent. The Brocken, its highest peak, rises 3,000 feet above the level of the sea. The Harz Mountains are covered by a system of forestry, which makes them a charming summer resort for the city people of Hanover. There are numerous small picturesque inns. This is one of the toy districts of Germany. Many of the toy houses, Noah's arks, and wooden animals on wheels, so attractive at the Christmas time, are made in the Harz Mountains. In the valleys, as might be expected, small saw mills are to be found along the streams. The Brocken is haunted by a specter, said to appear at sunset, and on the eve of Mayday witches are reputed to dance on its summit. These delusions, if we may call them so, have grown out of peculiar atmospheric conditions. At times mists from the valley rise in a perpendicular wall on which figures may be seen as though it were a curtain. People seem like giants, and domestic animals throw figures of grotesque monsters.

Hasdrubal. See HANNIBAL.

Hashish, hăsh′ēsh, an intoxicating preparation made by the natives of India from the tips of the hemp plant. The tips of the Indian variety of hemp are dotted with narcótic resin, associated with a powerful oil. The tips are dried and smoked either with or without tobacco. This oil produces a sort of intoxication. The same effect may be had by steeping the dried leaves and drinking the infusion. The hashish habit is prevalent among the Arabs also.

Hastings, Warren (1732-1818), governor-general of India. He was descended from an ancient English family of cavaliers, whose worldly possessions, including the Hastings estate, were lost during the troublous times of the Civil War. Warren was left an orphan, dependent on relatives for his education. He was sent to the village school and later to a grammar school. Conway, the poet, was a schoolmate and a lifelong friend. Warren was a boy of precocious ability and winning ways. He was ambitious. Among other boyish notions was the hope that he might some day buy back the ancestral estate. At seventeen his uncle, on whom he was dependent, decided to rid himself of his charge. He shipped young Warren to India as a clerk. Two years were spent in the great warehouse of the East India Company at Calcutta, posting ledgers and writing bills of lading. He was then placed in charge of a small branch station at Fort William, where he spent several years, buying and selling for the company.

When the Indian mutiny broke out in 1757 Hastings served in various capacities, first of all as a private in the ranks. His ability was soon recognized, however, and he was promoted to various positions of trust, becoming at length a member of the council. In 1764 he returned to England. It is said that he spent his time in resting, reading, and making acquaintances. He then applied to the company for employment and was sent to Madras.

In order to understand Hastings' subsequent movements it is necessary to remember that India was governed by independent native princes, who had been taken under the so-called protection of the English government. A monopoly of the right to trade with India, coupled with practical authority to govern the country, had been granted by Parliament to the East India Company. The directors of this company resided in London. The immediate management of affairs in India was intrusted to a council

resident in Calcutta. The company conducted a vast business. It maintained enormous warehouses in various parts of India and employed a fleet of ships which plied to and fro between its agencies and the wharves of London. Naturally, the directors were anxious for large profits. On his return to India Hastings was made a member of the council. He pleased the company of directors so well that he was later made the presiding officer or governor of the council. In this position Hastings set himself to amass revenue for the company and at the same time to advance his own fortune. Two instances will suffice to indicate the manner in which he worked. He took a province away from one nabob and sold it to another for a quarter of a million dollars. In return for another sum, rated at $2,000,000, he let the services of the English army to the powerful nabob of Oude, a villainous prince known in history as Surajah Dowlah. This Indian schemer proceeded to attack a neighboring province inhabited by the most intelligent, the bravest, and the most prosperous people in India. They were of Afghan blood and were known as Rohillas. They lived in the fertile plain of the Ramganga. Left to themselves, they were infinitely superior to the Indian robber. Incredible as it may seem, the English troops led the invasion of the province, did the fighting, captured the strongholds, and then stood aside and permitted—apparently unconcerned—the nabob's troops to plunder, massacre, and lay waste to their heart's content. The atrocities committed are too heathenish for print. How men of English blood could consent is yet a mystery. In this case, Hastings poured literally millions into the treasury of the company, and extended and strengthened its commercial business in every direction.

Reports of the atrocities committed under his administration reached London, however, and were, for years, a source of bitter controversy. At one time it would seem that Hastings must be recalled. At another, he was more supreme in Indian affairs than ever. Finally the end came. A party in the House of Commons, led by such men as Burke, Fox, Sheridan, and Pitt, moved for his impeachment. The vote carried in the House and a committee, of which Burke was chairman, was appointed to prefer charges against Hastings before the House of Lords. The episode is one of the most dramatic in English history. In his *Essay on Warren Hastings,* Macaulay has painted the scene in words that are remarkable in literature. He describes the great hall of William Rufus in which the trial was held. The solemn procession of one hundred seventy lords who assembled at the tribunal, the hangings of the galleries, the dress of the audience, the presence of members of the royal household, are touched with a master hand. One can hear the sergeant's proclamation and see Hastings bending his knee at the bar of justice. Burke, in the prime of his eloquence, preferred the charges, working up his audience into such a pitch of excitement that ladies fainted and strong men were unable to conceal their emotion. "At length," says Macaulay, "the orator concluded. Raising his voice till the old arches of Irish oak rerounded,

> "Therefore," said he, "hath it with all confidence been ordered by the Commons of Great Britain, that I impeach Warren Hastings of high crimes and misdemeanours. I impeach him in the name of the Commons' House of Parliament, whose trust he has betrayed. I impeach him in the name of the English nation, whose ancient honor he has sullied. I impeach him in the name of the people of India, whose rights he has trodden under foot, and whose country he has turned into a desert. Lastly, in the name of both sexes, in the name of every age, in the name of every rank, I impeach the common enemy and oppressor of all!"

Once the excitement was over, however, the trial languished and was dragged through a period of eight years. Hastings declared that he was indicted by one generation and tried by another. Eventually he was acquitted. At the conclusion the interest was so slight that but twenty-nine lords voted. There were only six votes against him. In the meanwhile, Hastings bought the old estate of Daylesford on which he had set his heart when a boy. Although his private fortune was expended in the trial, the directors of the East India Company remembered him generously. They advanced a large sum to meet his present necessities and settled a pension on him for life. He settled down to a life of literary

ease, taking an interest in the countryside. He conducted a number of experiments in raising fruit and stock. By degrees his crimes were forgotten. In 1813 when he ventured to visit the House of Commons, the members rose and bared their heads to him. At his death, much to Macaulay's regret, he was refused burial in Westminster Abbey. His remains were laid at rest with the bones of his fathers behind the chancel of the parish church of Daylesford.

The present solidity of English rule in India and the great change for the better that has taken place in the lot of the people of this vast region are due in no small degree to the energy and ability of Warren Hastings. He is one of the world's great men. It is a pity that his ability should have been stained by unnecessary and, it would seem, unworthy courses of action.

See INDIA; MACAULAY; CLIVE.

Hastings, Battle of, in English history, the decisive battle of the Norman Conquest. William the Conqueror landed on the southern coast of England and marched slowly toward London. Harold hurried southward and posted his men across the road at an advantageous point on the Hill of Senlac, seven miles from the town of Hastings. Harold's forces consisted largely of foot soldiers and men-at-arms. He fortified his post by a stockade and a ditch. William had a considerable number of cavalry and a fine body of archers. The battle took place October 14, 1066. According to popular account, now somewhat discredited, the first blow was struck by a Norman minstrel who rode out gayly in advance of William's forces. Throwing up his sword and catching it deftly by the hilt as it fell, all the while singing the song of Roland he was the first man to fall. During the day William charged Harold's position again and again without being able to effect a passage. The sturdy Englishmen hewed and hacked, shouting "Out! Out!" Toward evening, so the account runs, a band of William's forces made a feigned retreat, as though stricken with terror. Contrary to orders, one wing of Harold's troops rushed down into the plain to follow up their supposed advantage. Here they were cut to pieces by William's cavalry, which followed up its success by attacking Harold's position from the exposed side. Harold's men protected themselves so effectively against the flight of arrows by means of their shields that William directed his bowmen to let fly their shafts almost directly upward, so that they might descend very nearly perpendicularly. This they did, creating great havoc. One of these arrows struck Harold in the eye wounding him mortally. William's success was complete. He conducted his march upon London with all leisure, meeting no further opposition. The contest is by many called the Battle of Senlac, from the hill on which it was fought. See HAROLD; NORMAN CONQUEST; WILLIAM I.

Hat, a head covering provided with a brim all around. Straw hats worn by women are made, for the most part, of wheat straw braided in the vicinity of Florence, Italy. The braid is imported in quantities and is sewed into shapes in this country. Palm, panama, manila, and chip hats for men are woven from strips of palm leaves and palm fiber.

The silk hat, or cylindrical, flat-topped, stiff-brimmed dress hat, is about 150 years old. It was made first at Florence, but was introduced into America by way of Paris and London. The crown, the cylindrical part, and the brim are made separately, usually of linen cloth and gumlac. They are glued together, the crown at one end of the cylinder, the brim at the other. Silk plush is cut to fit and is ironed on faithfully with a hot iron, which softens the gumlac and causes the plush to adhere.

Felt hats were at one time made largely of the fur of the beaver, but rabbit's fur and the hair of the muskrat are now in use for the purpose. Hats made of the hair of the alpaca, camel, and the finer grades of wool shade off into cheap felts of wool mixed with cotton. In the very cheapest hats of this sort the materials are not felted, but merely glued together. The making of a felt hat is a peculiar art. A copper cone full of small holes revolves slowly over the end of a pipe or funnel, down which a strong current of air is drawn. The loose fur of the rabbit or other animal is fed to the cone with care and is drawn to it by the suction of the air, forming a bat of uniform thickness all over the outside of the cone. A wet cloth is then wrapped

about the bat and a second cone is slipped over it. The bat is now between two hollow cones and is subjected to pressure and to various baths and operations which cause the fur to felt. Each hair when examined under a microscope may be seen to be far from smooth. It is so rough, in fact, that when a bat of loose hair is patted together coaxingly, the hairs so interlace that a strong cloth or felt is formed that can scarcely be torn apart. The felted cone is then dyed, stiffened with shellac, shaped on a block, bound, lined, labeled, polished, and sent to market. Two bats are sometimes combined to make a heavy hat.

Prior to the American Revolution, hats, as well as boots and coats, were made to order. Each town had its hatmaker, its tailor, and its shoemaker. Each customer had a last for his shoe and a block for his hat. The term "blockhead" originated in this connection.

As to fashion, the three-cornered hat of the Revolution originated in Paris. The round-topped stiff hat is credited to England where it is exceedingly popular. Seen from above, a crowd on a London street looks like a lot of animated beetles. The soft hat has always been the favorite with mechanics and farmers. A heavy, wide-brimmed, soft hat, proof against rain, a shelter against heat, and not readily blown off, has long been the characteristic head gear of the plains. The wide, soft hat of the Mexicans and other Spanish-Americans is designated as a sombrero.

Hats were not unknown to the ancients, but it is uncertain to what extent they differed from turbans and caps. The custom of lifting the hat as an act of courtesy has grown out of the medieval custom of removing one's helmet as evidence of friendly intent, just as one would lay his sword or rifle by.

Although it is considered quite as boorish in England as in this country to wear one's hat in the house, British members of Parliament wear their hats when in their seats in the House of Commons.

Haskell Indian School, successor to the Carlisle Indian school, is the largest institution for Indians in the United States. It is located at Lawrence, Kansas. The Haskell School is so centrally located that the Government decided to maintain its largest institution here, and so save the Indians living in the far West the long trips necessary to attend the Carlisle School.

In 1923 there were 464 boys and 428 girls enrolled in the Haskell School. All the tribe represented are native to the United States proper, but there are a few from the Alaska tribes. The Sioux have the largest number of students of any tribe, and the Chippewas come next. Some of the almost extinct tribes have only one representative.

Hastings, Nebr., the county seat of Adams County, is 97 miles west of Lincoln, in the center of an agricultural and stock raising district. It is served by five railroads, and has an important trade in grain, produce and live stock. Flour, automobile accessories and agricultural implements are manufactured here. It contains Hastings College, a State Hospital for the Chronic Insane, good public schools and three parks. The water works and electric light plant are owned and operated by the city. The population in 1920 was 11,647.

Hattiesburg, Miss., the county seat of Forrest County, is on the Leaf River and on four railroads, 70 miles north of Gulfport. It is one of the most important yellow pine centers in the South. Its manufactures include lumber, cotton-seed oil, mattresses, fertilizer, bricks, boilers and foundry products. Here are located the Mississippi Normal College, the Mississippi Woman's College and good public schools. The water works are owned by the municipality. Population, in 1920, 13,270.

Hatto, Bishop. See MOUSE TOWER.

Hauberk, haw'berk, a long coat of mail. It was made of twisted steel links. Though heavy, it was pliable and proof against sword cut or thrust of spear. It had many forms. The skirt of the more complete hauberk fell below the knee. The wrist was extended into a chain mitten that covered the back of the hand. A high collar protected the neck, ears, and lower part of the face. A short-bodied, short-sleeved form was known as a habergeon. Defensive coats of this sort may be seen in the armor

room of any old European castle or museum of antiquities. See ARMOR.

Haultain, Sir Frederick William Gordon (1857-), a distinguished Canadian statesman and jurist, appointed chief justice of the supreme court of Saskatchewan in 1912. Born at Woolwich, England, he went to Canada in early youth and was educated at Peterboro Collegiate Institute and at Toronto University. He was called to the Ontario bar in 1882. Sir Frederick went to the Northwest Territories in 1884, and for some time was Crown Prosecutor at Fort McLeod. He was a member of the Advisory Council of the Northwest Territories and of the Territorial legislature during 1888-97, and betwen 1897 and 1905 was Premier, Attorney-General and Commissioner of Education. After the organization of Saskatchewan in 1905, Sir Frederick became leader of the Conservative party in the province. He was knighted in 1916, and was elected chancellor of the University of Saskatchewan in 1917.

Haultain Theodore Arnold (1857-), a Canadian essayist, was born at Cannanore, India, but went to Canada while very young. He there attended Toronto University; later, he studied medicine, but gave it up for a journalistic and literary career. He edited the *Educational Weekly* for a time, and from 1889 to 1893 was one of the librarians of the Toronto Public Library. During this time Mr. Haultain became well known through his frequent and brilliant contributions to British and American periodicals. Mr. Haultain was private secretary to Goldwin Smith from 1893 to 1910. His best known works are *A Critique of Cardinal Newman's Exposition of the Illative Sense, A Fragmentary Dialogue on Love and Religion, Two Country Walks in Canada, Hints for Lovers, England's Plight, A Returned Exile's Impressions, Goldwin Smith: His Life and Opinions* and *Of Walks and Touring Walks.*

Hauptmann, howpt'män, **Gerhardt** (1862-), a German dramatist, born at Salzburnn. He studied at the Breslau Art School, and later at the Universities of Jena and Berlin. His first play, published in 1889, was *Before the Sunrise,* a drama of marked socialistic thought. Then followed *The Feast of Peace, The Lonely Maiden,* the comedy, *College Crampton, The Weavers, The Beaver Skin,* and several others, all of a realistic type, showing the influence of Ibsen, Tolstoi, and Zola. Many people prefer his romantic plays; the two best known are *The Sunken Bells* and *Hannele's Dream Journey.* Dr. Edward Everett Hale says of him: "As has often been remarked, Hauptmann is an individualist; he chooses any form that he sees fit for self-expression, but he will not harden into an everyday conventionality even of his own making. You may sometimes find two of his plays that seem very much alike, but rarely are there three of a kind. But he gives you himself in each."

Havana, the capital of Cuba. The word is Spanish, meaning the harbor. Havana is the most important city in the West Indies. It is situated on the northern shore of the island at the inner bend of one of the finest harbors in the world. The entrance is narrow, and is defended by strong fortifications. The climate is, of course, tropical. The average temperature for the winter months is not over two degrees cooler than that for the summer. The usual range is from 71° to 82°. Frost is never known. The lowest temperature on record is 49.6°, the highest, 100.6°. The average annual rainfall is 54 inches. Snow was reported in Havana in 1856.

The city was founded by the Spaniards in 1519. They called it, and rightly, the key of the New World. It was taken more than once by pirates, and has been consumed by fire several times. The modern city has excellent wharves and a dry dock in which ships may be repaired. The railroads of the island center here. The city exports an enormous quantity of sugar, tobacco, cigars, and fruits. Customs receipts were $52,706,597 in 1920. Three-fourths of the business is with the United States. Naturally enough, the imports are chiefly flour, meat products, cotton cloth of various weights, and machinery. There is a street railway system of thirty-six miles. For those who are able to endure a rather warm climate, the city is charming. There are numerous open squares and parks, with attractive seats

under the shade of palm trees. There are fifty public fountains. Unlike some cities, the handsome residences are scattered throughout every quarter. There are numerous promenades and well shaded drives. The cafés are celebrated lounging places.

Prior to the independence of the island and the American management of city affairs, Havana was noted for the ravages of yellow fever. A supply of pure water was provided in 1895. It comes into the city from the mountains by means of an aqueduct seven miles long. The streets are now thoroughly clean and the sewerage system of the city is in order. The deaths from yellow fever have been reduced from the former figure of half a thousand a year to three or four cases. This result has not been attained without heroic effort. Squalid quarters have been torn down, cesspools cleaned out, whitewash used freely; in short, the city has been purged from center to circumference and made a decent, attractive place in which to live and do business. The population in 1919 was estimated at 365,506. See CUBA.

Havelock, Henry (1795-1857), **a major-general** in the East India service. He was a native of Durham, England. He entered the eastern service as early as 1823. During the Indian mutiny of 1856-57 he commanded a column including the seventy-eighth regiment of Highlanders. He fought a dozen sharp engagements, made forced marches, and was successful in retaking Cawnpur and in relieving Lucknow ere the garrison gave up. Whittier's stirring poem, *The Pipes of Lucknow,* gives Havelock due praise. Havelock died of dysentery two months and a day after raising the siege of Lucknow. His exploits were received at home with a storm of applause. The British Parliament hastened to heap honor and rewards on him; then, learning of his untimely death, made his eldest son a baronet and settled a pension of $5,000 a year on his widow. A statue in Havelock's memory was erected in Trafalgar Square, London. See LUCKNOW; CLIVE.

Haverhill, Massachusetts, situated at the head of navigation on the Merrimac River, 33 miles north of Boston and about eighteen miles from the Atlantic, is one of the largest centers of the boot and shoe industry in the world. The city is served by the Boston and Maine Railroad and by river boats. The boot and shoe industry, established here in 1795, dominates the industrial life of the city, but there are also important manfactures of paper boxes, leather, cement, nails, boot and shoe machinery and supplies, and woolen goods. Haverhill has fifteen parks, one, Winnikenni Park, having an area of 214 acres. Its public buildings are modern and handsome, the school system is adequate and is supplemented by several libraries and by the Bradford Academy for Girls. Haverhill is noted as the birthplace of John Greenleaf Whittier. In 1920 the population was 53,884.

Havre, hâ′vr **Le,** a city of France. The name is French, meaning the haven. It is situated on the northern side of the estuary of the Seine. It is virtually the seaport of Paris. One-fourth of the foreign trade of France passes over its wharves. In commerce it ranks next to Marseilles. A large dock fifty acres in extent has been excavated for the accommodation of the huge transatlantic steamers. Aside from its commercial importance, and the facilities for handling goods, the city is comparatively uninteresting. The corresponding port of England is Plymouth. These ports lie in the most direct route from London to Paris, but the traveler who desires to save time goes by way of Dover and Calais, port of England is Plymouth. Havre is the port of direct American traffic. In 1921 the population was 163,347. See FRANCE; SEINE.

Hawaii, hä-wī′ē, a territory of the United States. It consists of a group of islands lying in the Pacific Ocean about 2,100 miles southwest of San Francisco. The latitude is about the same as that of Porto Rico. There are seven inhabited islands. The largest is Hawaii. The others are Maui, Lanai, Molokai, Oahu, Kauai, and Niihau. There are also a dozen or more islets and coral reefs visited chiefly for guano and eggs. It is about 400 miles from one end of the group to the other. A slender chain of uninhabited rocks and islets stretches north by west for a distance of

1,350 miles. The total area is 6,449 square miles of which a small portion, only, is suitable for agriculture.

Honolulu, the capital and chief port is on the island of Oahu. The islands are the mere summits of volcanoes that rise from the ocean floor. Hawaii, the most southeasterly island of the group, has three active volcanoes. Mauna Kea, 13,805 feet high, is the loftiest peak in the Pacific Ocean. Kilauea has an oval crater nine miles in circumference. It is the largest active volcano in the world. For the benefit of tourists a telephone line runs from the hotels up to the crater. Mauna Loa, the third peak, has a circular crater 8,000 feet in diameter, with vertical inside walls from 500 to 600 feet high. The coasts of the islands are in places lava cliffs 2,000 feet high. In other places there are plains between the mountain and sea. A first sight of so much water and so little land gives visitors an impression of a toy country. There are coral reefs surrounding the islands, through which a number of artificial channels have been cut to permit the passage of ships.

The islands lie between the eighteenth and twenty-third parallels of north latitude. The trade winds blow from the northeast steadily from nine to ten months in the year. The northeastern sides of the peaks receive an enormous rainfall, amounting in places to 200 inches a year. The mountain slopes on that side are covered with heavy forests and swamps. The opposite slopes are arid and barren, except where they are irrigated by means of flumes and artesian wells. For a region so near the equator the climate is remarkably even and free from heat. The soil consists of disintegrated lava. It is exceedingly fertile. The cultivation in one part of the island is hampered by drouth, while possibly not over a mile away, or even on a different part of the same plantation, tremendous freshets carry away the soil. Water for purposes of irrigation is pumped at a cost as high as thirty-five dollars per acre. The upper slopes are devoted to pasturage and to the production of hides, tallow, and meat. The coasts produce bananas, pineapples, and cocoanuts. Ninety-five per cent of the effort of the islands, however, goes to the production of cane-sugar. The cane is said to be the sweetest in the world. The annual product at last accounts was not far from 600,000 tons. Coal is wanting; wood is scarce; crushed stalks of sugar-cane is the chief fuel.

The labor problem is a serious one. The native islanders, who constitute about one-fifth of the population, cannot be induced to work. European labor is too expensive. The Federal estimate of 1921, gave the population as 255,912; of these 109,274 were Japanese, 23,723 Hawaiian, 21,031 Filipino, 19,000 part Hawaiian, 23,507 Chinese. The remainder are Porto Ricans, Koreans, Europeans and Americans. Japanese immigration is prohibited.

The islands, though not unknown to the world, were visited and described for the first time in 1778 by Captain James Cook. He called them the Sandwich Islands. In 1792 cattle were introduced by the Dutch navigator, Vancouver. A fine growth of fragrant sandalwood, now depleted, attracted American and English ships. An active trade in the exchange of firearms, cloth, knives, beads, looking-glasses, and the like was set up. American missionaries were established in the islands early in the nineteenth century. In 1820 a native ruler of Hawaii brought the other islands under subjection and caused the Christian religion to be adopted officially. His descendants became extinct in 1872. During the period of local faction which followed, intriguing Americans succeeded in overthrowing Queen Liliuokalani. She had been chosen by the native legislature and was aiming to restore the heathen customs. Without going into detail, it may be said that July 4, 1894, the resident Americans proclaimed a republic with Sanford B. Dole president. In 1898 Congress ratified a treaty with President Dole's government for the annexation of the islands. June 14, 1900, Congress organized the territory of Hawaii, with Dole governor. The inhabitants of Hawaii are therefore citizens of the United States.

The population is increasing rapidly. There are about 150 miles of railroad on the islands. A cable line runs the length of the group. Local telegraph lines have been established. The territory has a debt of about $4,000,000. A system of graded

free schools has been established. This measure became necessary because the foreign language schools became so thoroughly Japanese. All schools are now under a strict territorial law, and the English language is taught in every school. The compulsory school age is from 6 to 15 inclusive. The percentage of illiteracy is very high.

The social situation has become complicated due to the increase of the Oriental population. In 1920 the Japanese and Chinese formed 44 per cent of the entire population. The remainder consists of native Hawaiians, Americans, Scandinavians, Portuguese, Russians, Porto Ricans, and a few from other nations. The race tolerance in Hawaii is very marked.

STATISTICS. The following statistics are the latest to be had from reliable sources:

Area, square miles	6,449
Forest reserves, acres	817,109
Population (1920)	255,912
Hawaiian	23,723
Asiastic Haiwaiian	6,955
Caucasian Hawaiian	11,072
Portugese	27,002
Porto Rican	5,602
Spanish	2,430
Other Caucasian	19,708
Chinese	23,507
Japanese	109,274
Filipino	21,031
Korean	4,950
Negro	348
All others	310
Principal islands	8
Members of territorial senate	15
Members of house of representatives	30
Salary of Governor	$ 10,000
Representatives in Congress	1
Assessed valuation of property	$286,557,532
Bonded indebtedness	$ 12,600,000
Expenditure (1920)	$ 8,338,041
Farm area, acres	2,702,245
Improved land, acres	435,242
Sugar cane, short tons	521,459
Pinapples, cases	5,500,000
Sugar, tons	583,894
Total Exports	$ 75,115,983
Sugar	$ 63,743,272
Fruits	$ 28,527,603
Coffee	$ 424,381
Rice	$ 583,894
Miles of railway	969
Teachers in public schools	1,362
Pupils enrolled	41,151

A PRONOUNCING VOCABULARY.

Hawaii	hä-wī′ē
Kauai	kow-ī′ē
Kilauea	kē-lau-ā′ä
Lanai	lä-nä′ē
Liliuokalani	lē-lē-wō-kä′la-nē
Maui	mou′ē
Mauna Kea	mou′nä kā′ä
Mauna Loa	mou′nä lō′ä
Molokai	mō-lō-kī′
Niihau	nē-ē-how′
Oahu	ō-ä′hōō

See HONOLULU; COOK; LEPROSY; DAMIEN.

Hawk, a bird of prey belonging to the falcon family. There are 300 or 400 species of falcons, hawks, and eagles in the world; thirty or more are found in North America. They usually migrate in flocks but, in hunting and nesting, they are solitary birds. The hawk lives chiefly on insects and small mammals, such as field mice and ground squirrels. Bird students insist that few birds are caught by hawks and that their service in keeping fields free from destructive animals is so valuable that, aside from the sparrow hawk, their occasional theft in a poultry yard is not worth mention. They nest usually in trees, though in a prairie country they build in bushes or even on the ground. Eggs, two to six, according to the species. The female is larger, stronger, and bolder than the male. The hawk is swift and silent on the wing, so that its approach is not heard by its prey. The claws are formed for seizing and holding. The hawk strikes with the hinder claw in pouncing and grips with the other so as to hold firmly. When the leg is bent a cord or tendon closes the talons so that they cannot be opened without straightening the leg. When a hawk strikes an animal its settling weight, by bending the legs at the knees, serves to close the talons and clutch the prey. This gives a hawk and all birds of prey a grip such as a person would have if his hand could not be opened or shaken off so long as his arm were bent at the elbow. The bill is also strong and well adapted to tear flesh apart.

Among the hawks most often seen several deserve mention. The fish hawk or American osprey lives almost wholly on fish which it catches by darting from the wing. It nests usually in a tree in a swamp. The swallow-tailed hawk or kite, black above and white beneath, with long pinions and a forked tail, is ever on the wing. The

snail hawk of Florida dives into shallow water for a snail, then flies to a low perch to enjoy it, picking out the flesh without injuring the shell. The marsh hawk, a gray, ashy bird above, white beneath, with a white patch on its rump, is about twenty inches long. It courses ceaselessly over low grounds and is an exception by way of nesting on the ground. The red-tailed hawk and the red-shouldered hawk are not

Cooper's hawk.

infrequently called chicken hawks. Of 782 stomachs of chicken hawks examined by Dr. Fisher, of the United States Department of Agriculture, 120 contained poultry or birds; 390, mice; 171, other small mammals; 27, snakes; 69, frogs; 141, insects; 16, spiders; 15, crawfish; 3, fish; 1, centipedes; and 103 were empty. Of the duck hawk, the falcon of history, a less favorable report is made. The falcon lives almost entirely on ducks, teal, snipes, and other birds caught near the shore. The pigeon hawk, named from its appearance, lives chiefly on small birds. Other names are the rough-legged, the sharp-shinned, the short-tailed, the broad-winged, Cooper's, and Swainson's. Reviewing Dr. Fisher's examination of over 2,700 stomachs of hawks and owls, Dr. C. Hart Merriam, Chief of the Division of Ornithology, makes a strong plea for discrimination. He says:

> Only six of the seventy-three species and subspecies of hawks and owls of the United States are injurious. Omitting the six species that feed largely on poultry and game, 2,212 stomachs were examined, of which fifty-six per cent contained mice and other small mammals, twenty-seven per cent insects, and only three and one-half per cent poultry and game birds.

The investigation seems to have been made with care. If the conclusions are correct, the farmer should shoot only the few species that prey on game and poultry. The other species should be encouraged to nest, and to assist the domestic cat in keeping down the number of squirrels and mice that are injurious to crops.

See FALCON; EAGLE; OWL.

Hawkins, Anthony Hope (1863-), an English novelist. He was born in London and received his education at Oxford. He studied law and was admitted to the bar in 1887. He practiced until 1894. In that year he published *The Prisoner of Zenda,* over the pseudonym of Anthony Hope. It was a striking literary success. It is a romance as thrilling as a medieval tale of knight errantry, but is presented in a nineteenth century environment. The plot hinges upon the resemblance between a young Englishman and the king of an imaginary state of South Germany. Other writings of Anthony Hope's are *The Dolly Dialogues, Double Harness, Heart of Princess Osra, Rupert of Henzau,* which is a sequel to *The Prisoner of Zenda,* and *Sophy of Kravonia.*

Hawkins, [or Hawkyns] **Sir John** (1532-1595), an English naval commander whose methods of trading with the Spaniard and Portugese bordered closely upon buccaneering. He was born at Plymouth, England, and followed the sea from a very early age. In 1562 Sir John took from the Portugese slavers a cargo of 300 blacks. Sailing then to the West Indies, he forced the Spaniards to take the slaves in ex-

change for hides, spices, sugar and other commodities. Sir John had influential backers in England, and after more successful expeditions like the one mentioned, he was given a coat of arms, with a chained negro slave as his crest. He became a favorite with Queen Elizabeth, was elected to Parliament, and for valorous service against the Spanish Armada in 1588 he was knighted.

Hawthorn, a shrub or small tree. The botanical name is Crataegus. It is a member of the rose family and is closely related to the apple. *Bailey's Cyclopedia* describes twenty-one species. The hawthorn of English literature is midway between a shrub and a small tree. It grows to a height of fifteen feet. It has spreading branches and stout spines. It bears rounded corymbs of fragrant flowers. The scarlet fruit is globular, and is from one-third to half an inch in diameter. The hawthorn has strong wood and heavy spines, making it suitable for hedges. It grows wild in northern Africa, the greater part of Europe, and in western Asia. It has been introduced into the United States. Washington planted a hedge at Mt. Vernon. The hawthorn is a favorite with the English poets. See APPLE.

> The hawthorn whitens; and the juicy groves
> Put forth their buds. —Thomson.

> The hawthorn bush, with seats beneath the shade,
> For talking age and whispering lovers made.
> —Goldsmith.

Hawthorne, Julian (1846-), an American novelist and miscellaneous writer. He is the son of Nathaniel Hawthorne. He was born in Boston. He received his education at Harvard University and at Dresden, where he studied civil engineering. Finding a more congenial occupation in literature, he has devoted himself to that pursuit since the early seventies. His principal novels are *Bressant, Garth, Sebastian Strome, Archibald Malmaison, A Fool of Nature. Nathaniel Hawthorne and His Wife* ranks among the best of biographies. *Saxon Studies, Confessions and Criticisms,* are works of a critical nature.

Hawthorne, Nathaniel (1804-1864), a distinguished American author. Hawthorne was born at Salem, July 4, 1804. The old Hawthorne house is still standing on Union Street. It is a plain, wooden, clapboarded building, two stories high, with a gabled roof, inclosing a large garret, the favorite resort of children on rainy days. Hawthorne's father was a sea captain, descended from a respectable English family. An ancestor was a judge during the trial of witches at Salem. Captain Hawthorne died abroad of yellow fever in 1808. Mrs. Hawthorne went home with her children to her father's house which was so near by that their gardens joined. Hawthorne's uncle, Robert Manning, took charge of his education. Nathaniel was a great reader. His earliest favorite was *Pilgrim's Progress,* "which he used to read by the hour, perched up in a large chair in the corner of his grandmother's room, near a window." He was fond of Thomson, Pope, Milton, and Shakespeare. The *Faerie Queene* was the first book bought with his own money. The little fellow was given to inventing long, fanciful stories, telling where he was going when he grew up, and of his wonderful adventures, always ending, "And I'm never coming back again." The *Waverley Novels* had just appeared and were a great source of pleasure to young Nathaniel.

Among Hawthorne's instructors was Joseph Worcester of dictionary fame. In 1818 Mrs. Hawthorne and the children accompanied her brother Richard to Maine where they resided for a year. "I lived in Maine," said Hawthorne, "like a bird of the air, so perfect was the freedom I enjoyed." He appears to have enjoyed skating, boating, and camping. After returning to Salem, "N. Hawthorne" embarked on the publication of a Wednesday paper which he called the *Spectator,* "price twelve cents per annum, payment to be made at the end of the year." For a young lad, he used a great many long words. An editorial on courage contains some views on the fictitious reputation enjoyed by many. He tells of blundering into the enemy's ranks during a battle of snowballs from which he retired upon receiving a tremendous volley, but he was congratulated by his own party for his great courage, which, of course, he did not deserve. The following quotation from the same editorial is certainly amusing, and shows that authors are not born without some faults of style: "A lady kills a striped

snake while swallowing a toad. We have it from herself. This is true courage."

Hawthorne entered Bowdoin College in his seventeenth year. He graduated with the famous class of 1825, which contained besides himself, such men as H. W. Longfellow, J. S. C. Abbott, and Franklin Pierce. Hawthorne appears to have remained at home for many years, reading, writing, and contributing articles to various periodicals. In 1837, he collected a number of fugitive pieces and published them under the name of *Twice-Told Tales.* A second volume was added in 1842. In the preface, he claims one distinction, that he is the "obscurest man of letters in America." In 1839 Hawthorne was weigher and gauger in the customs office of Boston, the historian, Bancroft, being at that time collector. He was also a participant in the Brook Farm experiment, but its life was distasteful to him.

Hawthorne was married in 1842 to Miss Sophia Peabody and went to live at Concord in the house which became celebrated as the *Old Manse.* Here he dreamed, and here he wrote his *Mosses from an Old Manse.* They were expelled by the return of its owner. In 1845 Hawthorne was recommended to President Polk by his old friend Bancroft, and was made surveyor of the port of Salem. The Salem custom-house is described in the *Scarlet Letter,* which was published in 1850. The *House of Seven Gables* followed in 1851. The *Wonder Book, Tanglewood Tales,* and *The Blithedale Romance* came in succession. In 1853 Hawthorne was appointed to the consulate of Liverpool by his classmate, Franklin Pierce, then president. His continental life he has described in his *French and Italian Note-Books.* At the expiration of his official life, Hawthorne continued to live in Italy, residing for a time in Florence. The results of his seven years abroad were *The Marble Faun* and *French and Italian Note-Books.* Hawthorne returned to America in 1860, and resumed his residence in his home of "The Wayside" at Concord. Here he wrote until May 19, 1864. He left unfinished *The Dolliver Romance.* His grave is under a group of pines on the brow of a hill. Emerson, Longfellow, Lowell, Holmes, and Whipple, and his dearest friend, Pierce, attended his funeral. Hawthorne is considered one of America's greatest writers. English critics, who are unsparing in their treatment of American literature, usually give Hawthorne high place.

SAYINGS.

Created by Providence expressly for our use.

Sin may become a powerful factor in the development of mind and soul.

Cursed habit of solitude.

The Devil himself gets into my inkstand, and I can only exorcise him by penfuls at a time.

I went to live in Arcady and found myself up to the chin in a barnyard.

Each sect surrounds its own righteousness with a hedge of thorns.

Each human soul is the first-created inhabitant of its own Eden.

Every author has imagined and shaped out in his thought more and far better works than those which actually proceeded from his pen.

The greatest obstacle to being heroic is the doubt whether one may not be going to prove one's self a fool.

If I pride myself on anything it is because I have a smile that children love.

TRIBUTES.

I never knew him to utter an unmanly sentiment or to do a mean thing.—Bridge.

He is like a dim room with a little taper of personality burning in one corner of it.—Holmes.

A November nature with a name of May.—Lowell.

His voice touched the ear like a melody.

The most wonderful eyes in the world, searching as lightning, and unfathomable as night.

The Scarlet Letter is "ghastly."—Emerson.

He had a spiritual insight, but it did not penetrate to the source of spiritual joy.

The world would sooner see another Shakespeare than another Hawthorne.—Emerson.

It were idle to deny that the life of Nathaniel Hawthorne does not attract one to him as a man, so warmly and genially as one is attracted to personalities like Charles Lamb or Robert Louis Stevenson. But there was much that was admirable in Hawthorne's character. He was in his work the New England conscience made flesh; surely an important role and mission.—Richard Burton.

Mr. Hawthorne's difficulty seems to have been to find in the vast human workshop of America a frame sufficiently picturesque for the reception of his richly colored pictures.—*London Times.*

. . . In seclusion and remote from men
The wizard hand lies cold,
Which at its topmost speed let fall the pen
And left the tale half told.
Ah! who shall lift that wand of magic power,

And the lost clew regain?
The unfinished window in Aladdin's tower
Unfinished must remain!
—Longfellow, *from poem written on the death of Hawthorne.*

Hay, any grass or sedge cut green and dried for forage. By extension the term covers forage prepared from many other plants, as clover and alfalfa, which belong to the pea family; but it is not applied to the straw of the cereals, as oats and wheat, although they are grasses, nor to the fodder of corn, which is also a grass. Wild hay is made from native grasses growing in natural meadows. Tame hay is made usually from timothy or clover, or from both. The best advice to the haymaker is to follow the adage and "make hay while the sun shines." To secure the best quality of hay it must be cut in the blossom, dried in the sun, and stored under shelter without rainfall. A well built haystack forms a natural thatch. In many parts of the United States the entire crop, especially of wild hay, is stacked out of doors. Recent statistics put the annual cut of hay in the United States at 70,000,000 tons, worth $635,000,000 on the farm. The average yield per acre the United States over is about a ton and a quarter. Irrigated lands and river bottoms bring the largest yield. Farm prices vary exceedingly in different states. A ton of hay is worth twice as much in the Atlantic states and in the Ohio Valley as it is in the prairie region included between the dry plains and the Mississippi River. Minnesota leads in the production of wild hay; Kansas leads in millet, Hungarian grass, and Kafir corn; Indiana leads in red clover, and California in grains cut green for forage. The total hay crop of the United States is worth more than the wheat crop, but not so much as corn.

PRODUCTION OF HAY IN THE UNITED STATES.

State	Tons
Maine	996,000
New Hampshire	428,000
Vermont	945,000
Massachusetts	529,000
Rhode Island	50,000
Connecticut	416,000
New York	4,895,000
New Jersey	396,000
Delaware	88,000
Pennsylvania	3,630,000
Maryland	526,000
Virginia	930,000
West Virginia	870,000
North Carolina	711,000
South Carolina	360,000
Georgia	610,000
Florida	80,000
Ohio	4,081,000
Indiana	2,729,000
Illinois	3,743,000
Wisconsin	4,136,000
Michigan	2,928,000
Minnesota	2,924,000
Iowa	4,659,000
Missouri	3,616,000
North Dakota	1,297,000
South Dakota	1,358,000
Nebraska	2,817,000
Kansas	2,791,000
Kentucky	1,104,000
Tennessee	1,528,000
Alabama	769,000
Mississippi	492,000
Louisiana	266,000
Texas	882,000
Oklahoma	1,383,000
Arkansas	724,000
Montana	1,881,000
Wyoming	1,228,000
Colorado	2,507,000
New Mexico	458,000
Arizona	450,000
Utah	1,284,000
Nevada	473,000
Idaho	2,984,000
Washington	2,621,000
Oregon	2,288,000
California	5,003,000
United States	81,567,000

Hay Fever, an affection of the mucous membrane of the nose and throat which results usually in violent sneezing, headache, and a constant watery discharge from the nose and eyes, with sometimes great difficulty in breathing, as in asthma. It is a nervous disease, brought on, apparently, by the pollen from flowers or by fine dust, such as rises from hay. The attack usually occurs late in August, though it may come in the spring, and lasts from two to six weeks. A change of climate, preferably to the lake shore or seaside, is the only certain relief, though if this is impossible, relief may be obtained by serums which should always be administered by a physician. The disease is called also hay asthma, hay cold, rose cold and rose fever. See ASTHMA.

Hay, John (1838-1905), an American author and statesman. He was born at Salem, Indiana. He died in Washington. He was educated at Brown University and

studied law at Springfield. As a young man, he was fortunate enough to attract the attention of Abraham Lincoln, who took him to Washington with him as a private secretary. He was a quiet, modest young man, an indefatigable worker. He seemed to know intuitively just what ought to be done. He became indispensable to the president. A warm friendship grew up between them which has been compared to that of Washington and Hamilton. Lincoln used to send Hay with dispatches to the various armies. In reality, however, he went to bring back confidential information as to the condition of affairs. When Lincoln died Hay felt that his best friend was gone and that life was over. Later he coöperated with Nicolay in writing an extended biography of Lincoln. At the close of the war Hay was sent to Madrid as secretary of the American legation. He took advantage of the information gathered to write a charming book of observations on Spanish life and manners, called *Castilian Days.* He was connected with various embassies, and, though a shrewd observer, —one of the keenest men of his day—he had the tact to maintain a quiet demeanor, and, above all, to refrain from talking. At the close of his diplomatic service, Hay was invited by Horace Greeley to accept an editorial position on the New York *Tribune.* During this period he published a volume of verses known as *Pike County Ballads.* His most noted poem is *Little Breeches.*

President McKinley appointed Hay ambassador to the court of St. James, that is, to London, a position which he occupied during the Spanish American War. He discharged the duties of his office with such ability that, at the close of the war, he was called home to become secretary of state, a position which he held until the time of his death. It was during his management of our diplomatic service that the European powers, after the Boxer uprising of 1900, were prevented from dividing China. He induced their governments to declare that China should remain united, and that her ports should be open to the commerce of all nations. This is known as the "open door" policy. When he died King Edward, who had known him at London, cabled, "His loss is an international one." President Roosevelt, who generally means what he says, declared that the Americans have never had a greater secretary of state. See BOXERS.

Haydn, hā′dn, **Joseph** (1732-1809), an Austrian musician. He was born on the borders of Hungary and died at Vienna. He received his early education at Hamburg. At eight he was received into the boy choir of St. Stephen's Cathedral at Vienna. At sixteen his voice changed, and he was thrown upon the world for himself. He came under the influence of Bach's music, to which, as he himself stated, he owed the inspiration of his life. He gave music lessons and attracted the attention of some of the leading musicians of the city. Later he obtained a position as an organist, and life went on more easily thenceforward. In 1761 Haydn was appointed chapel master, or musical director, by Prince Esterházy, a position which he retained for thirty years. Haydn was one of the world's great musical composers. A complete list of his works has never been compiled. Nearly 400 pieces are known. In 1790 he was received in London with great enthusiasm. His greatest composition is an oratorio, *The Creation,* the words to which are a translation into German from Milton's *Paradise Lost.* While listening one evening to the storm of applause that followed a rendering of his *Creation,* Haydn was seized with faintness and was carried from the theater in a large chair. As he turned from the audience, tears streaming from his eyes, he held out his hands as if to bless the orchestra. This was his last appearance in public. See BACH.

Hayes, Rutherford Birchard (1822-1893), the nineteenth president of the United States. He was born at Delaware, Ohio, and died at Fremont in the same state. He was graduated at Kenyon College in the class of 1842. He studied law at Harvard and practiced at Marietta and Cincinnati. At the outbreak of the Civil War he entered the service as captain of a Cincinnati company and rose to be a major-general. At the close of the war he shared the political good fortune that befell many soldiers. He was sent to Congress in 1864 and was elected governor in

1867. He was reëlected in 1869 and again in 1875. His ability to carry Ohio, then regarded as a doubtful state, led to his nomination for the presidency by the Republicans in 1876. His Democratic opponent, Samuel J. Tilden, received the greater number of popular votes, but Hayes was seated by the Electoral Commission. As president, Hayes stood for the withdrawal of troops from the South, for a gold standard, and for civil service reform. While not a great man, President Hayes was eminently worthy of respect. He took an active part in the educational and charitable movements of his native state. See ELECTORAL COMMISSION.

Hayne, Paul Hamilton (1830-1886), an American poet. He was born at Charleston, South Carolina, grew up there, was educated at Charleston College, studied law, and took up newspaper work. He served upon *Russell's Magazine* and upon the Charleston *Literary Gazette*. Upon the outbreak of the Civil War he enlisted but was soon forced to resign on account of ill health. Having lost his property through fire and pillage he retired an invalid to Grovetown, Georgia, where he spent the rest of his life. Several volumes of graceful poems have come from his pen, a complete edition being issued in 1882. He ranks among the most pleasing singers the South has produced. He was a nephew of Robert Y. Hayne of whom he wrote the biography.

Hayne, Robert Young (1791-1839), was an American statesman, born in Colleton District, South Carolina. He was admitted to the bar in 1812, and after serving in the War of 1812, practiced law in Charleston until his election to the state legislature, where he spent four years, one year as speaker of the House. In 1818 he was made attorney-general of his state, and five years later was elected to the United States Senate, where he remained until 1832, being then elected governor of his state. After two years as governor he became mayor of Charleston. He is best known as an advocate of the States' Rights Doctrine. In the famous Webster-Hayne debate of 1830 he declared that a state might under the constitution secede at pleasure, and was chairman of the state convention that prepared the famous Nullification Ordinance. Later as governor of South Carolina he prepared for resistance to federal authority if it were used to enforce Jackson's policy against nullification. Serious trouble was averted by Clay's compromise measure. See NULLIFICATION; DANIEL WEBSTER.

Hay—Pauncefote Treaty, a treaty between the United States and Great Britain, which abrogated the unpopular Clayton-Bulwer Treaty (which see), and defined the policy of the United States with reference to the construction and maintenance of a canal across the Isthumus of Panama. The treaty was drawn by Secretary of State of the United States John Hay and Sir Julian Pauncefote, British Ambassador to the United States. As it stood originally (1900) the article provided: (1) that a canal should be built by, or under the direction of, the United States; (2) that it should be neutralized on the same basis as the Suez Canal; (3) that other nations than Great Britain and the United States should be asked to join in the guarantee of neutrality. When it was found that the provisions were disagreeable to the Senate, amendments were offered; they were not acceptable to Great Britain, however, and the treaty expired by limitation in March, 1901. At a second conference, a new treaty was drawn, providing: (1) that no nation was to be asked to guarantee neutrality; (2) that, though the Clayton-Bulwer Treaty was nullified; its principles of neutrality were to be fully observed; and (3) that to the United States was to be given undefined rights of control in time of war; and it was not demanded that the canal be kept open and free than as in peace times. Further, no restrictions were placed upon the fortification of the canal so as to insure its proper defense. All nations were to be admitted to use of the canal on equal terms, and the principles of neutrality were not to be affected by any change of sovereignty of the Isthmus.

Congress passed the Panama Canal Act in 1912, providing that American vessels engaged in domestic commerce should not be taxed as were the ships of other nations. To this Great Britain stoutly ob-

jected, on the ground that it was a violation of the "equal rights to all nations" clause, suggesting that the question be settled by arbitration. At that time nothing was done concerning this point in the negotiations; but a bill was passed in 1914 repealing the provision of the Panama Canal Act that had caused the dispute.

Hays, Charles Melville (1956-1912), an American railroad executive, was born at Rock Island, Illinois, and began railroading when only seventeen. Mr. Hays was an ambitious and extremely able man, and at the age of thirty had attained to the office of general manager of the Wabash Railroad, having previously served the Atlantic & Pacific and the Missouri Pacific roads. In 1897 he was offered the general managership of the Grand Trunk Railway, and from his long connection with this and other Canadian roads Mr. Hays is usually thought of as a Canadian. He had a vision of the Dominion of Canada adequately served by rail, and to realize this vision became his sole object. Through his efforts the entire Grand Trunk system was reorganized; the Central Vermont Railroad, a Grand Trunk subsidiary, was reorganized; and the Grand Trunk was double tracked from Montreal to Chicago. Mr. Hays was chosen president of the Southern Pacific Railroad in 1901, but in the fall of that year he returned to Canada to become general manager and second vice-president of the Grand Trunk. He died in the *Titanic* disaster.

Hazel, a shrub or small tree belonging to the cupbearing family, which includes the oak, the chestnut, and other trees whose nuts are borne in cups. The drooping catkins furnish pollen. The pistils may be seen in early spring when pollen is falling. Look for them on the ends of little branchlets. We have two hazelnuts in the east, the American and the beaked. The bracts, or cup, of the latter are prolonged beyond the nut into a bristly beak from a third of an inch to an inch in length. The nut is also more pointed. A shorter beaked hazel grows also on the Pacific coast. There are eleven kinds in all. Filberts are European hazelnuts reared in plantations and shipped to this country. Promising attempts have been made to raise filberts in California. London buys a half a million dollars worth of filberts a year. See NUT.

Hazen, Sir John Douglas (1860-), a Canadian attorney and statesman, Chief Justice of New Brunswick, was born at Oromocto, New Brunswick, and was educated at the Collegiate School, Fredericton, and at the University of New Brunswick. Called to the bar in 1883, Sir John rose very high in his profession, attaining the Presidency of the Barrister's Society of New Brunswick and of the St. John Law Society. In 1891 he was elected to the Dominion House of Commons for St. John City and County, and to the New Brunswick Legislature in 1899. He was twice re-elected to the latter office, and was leader of the opposition during his incumbency. Becoming premier and attorney general of New Brunswick in 1908, he and his cabinet were sworn in in 1909. In 1911 he was chosen by Premier Borden for the Federal cabinet. From 1911 to 1917 Sir John was Minister of Marine and Fisheries and of Naval Service, and in the latter year was also a member of the Imperial War Cabinet. In that year he was also chosen Canadian Permanent Commissioner at Washington, D. C.

Hazen, William Babcock (1830-1889), an American army officer who, by cooperating with physicists, electricians, meteorologists and state weather bureaus, was notably successful in raising the efficiency standard of the United States Signal Service Bureau. He was born at West Hartford, Vt., and was graduated from West Point in 1855. After a period of frontier service, he was promoted captain of regular infantry, and went to the front in the Civil War as colonel of the Forty-First Ohio Volunteers. In 1864 he was promoted major general of volunteers. Major General Hazen won distinction at the battles of Shiloh and Corinth and at Missionary Ridge, and commanded a division in Sherman's march to the sea. During the Turko-Russian War Major General Hazen was military attache of the American Legation at Vienna. Appointed chief signal officer in 1880, he built up the

Signal Service, and introduced the hourly weather bulletin system and the "cold wave" signals. The present standard time meridians were adopted partly through his efforts. He is the author of *The School and the Army in Germany and France with a Diary of Siege Life at Versailles, Our Barren Lands* and *A Narrative of Military Service.*

Hazleton, Pa., an industrial city, is 24 miles south of Wilkes-Barre, on the Pennsylvania and the Lehigh Valley railroads. Owing to its fine location at an elevation of about 1,700 feet, it has lately attained some popularity as a summer resort. Its industrial activities are closely linked with the mining and shipping of the anthracite coal found in the vicinity. Among manufactures are foundry products, baking pans, paper boxes, shirts, underwear, silk, knit goods and machine shop products. It contains a state hospital for miners, a township high school, a public library and modern graded schools. Population in 1920, 32,277.

Hazlitt, William (1778-1830), an English essayist and critic. He was born at Maidstone, Kent. He entered a Unitarian college, but found the study of art and literature more congenial than that of theology. He determined to become a painter, but after some years renounced art for literature. He was one of the group of writers called the "Cockney School," but he quarreled with Leigh Hunt, with Lamb, and with Moore. He also attacked his older friends, Coleridge, Southey, and Wordsworth. He wrote many political articles, criticisms on art and on theatrical subjects, and delivered lectures on English philosophy, English poets, and on subjects connected with the stage. His best known works are *Characters of Shakespeare's Plays, A View of the English Stage, Lectures on the English Poets, Lectures on the English Comic Writers, Lectures on the Elizabethan Age.*

Headache, a disorder which is an attendant symptom of many ailments, but not a disease in itself. Eye-strain is probably the cause of the majority of headaches, with indigestion due to over-eating or over-drinking a close second. The approach of a fever, such as scarlet fever or typhoid, is usually heralded by a headache. Injuries to the brain, brain diseases, and meningitis are frequently accompanied by this symptom. Severe periodic headaches indicate either poor blood, a general weakness of the nerves, or some organic disease, and should be regarded as serious. The use of headache powders is not only profitless but dangerous, for the relief they give is caused by the depressing action upon nerves and heart of powerful drugs they contain. Their use has often resulted in actual death.

Hearn, Lafcadio (1850-1904), an international author and journalist. He was born in the Ionian Isles of Irish and Greek parentage and died in Tokio, Japan. He resided for a number of years in Cincinnati, New Orleans, and New York, and later in Japan. Hearn's first success came as a reporter for a city daily. At the time of his death he was professor of English literature in the University of Tokio. He had become a Japanese subject with the name of Yakumo Koizumi. He is well known as the author of numerous books relating to the life, literature, history, customs, superstitions, and religion of Japan. He is considered by Americans, at least, the ablest foreign interpreter the Mikado and his flowery kingdom have ever had. Among his books may be mentioned *Some Chinese Ghosts, Chita: A Memory of Lost Island, Out of the East, Glimpses of Unfamiliar Japan, Kokovo, and Kotto, or Japanese Curios.*

Hearne, Samuel (1745-1792), a Canadian explorer and trader who, as an employe of the Hudson's Bay Company, was largely instrumental in extending the Company's influence westward and establishing friendly relations between the Company and the Indians. While stationed at Fort Prince of Wales, Hearne was shown some lumps of crude copper brought in by the Indians from the far north. When, in 1769, the Company decided to explore the source of the copper, Hearne was chosen to lead the expedition, and at the same time to discover the existence of the reputed Northwest Passage. After several trials, he reached the mouth of the Coppermine

River in 1771, returning to the fort in 1772. Much of the later development of the Company was based upon the reports brought back by Hearne.

Hearse, a carriage for conveying the dead to burial. The hearse is roofed usually and has plate glass sides, with a door at the rear through which to admit the coffin. Trappings of hearses for adults are traditionally black. White hearses have come into use for children and may very probably replace the black hearse altogether. Some modern automobile hearses carry casket and mourners at the rate of thirty miles an hour. The origin of the name is interesting. The earlier spelling of the word is herce.

Hearst, Phebe Apperson (1842-), an American philanthropist, mother of William Randolph Hearst. Mrs. Hearst is a woman of wide interests, but one of her favorite undertakings is the furthering of kindergarten work. She established and supported classes in this branch of education in San Francisco, Cal., for many years, and later maintained a training class for kindergarten teachers at Washington. More recently she established kindergarten classes at Lead, S. Dakota. In the latter town and in Anaconda, Mont., she built and for a time maintained public libraries. In Washington, D. C., she built the National Cathedral School for Girls (Episcopal) at a cost of $200,000. When the enlargement of the University of California was planned, Mrs. Hearst paid the cost of a notable architect's competition, and in memory of her husband, she built and equipped a building at Berkeley.

Hearst, William Randolph (1863-), an American editor and politician. He was born in San Francisco, his father being a noted capitalist and politician, and studied for a time at Harvard. In 1886 he became owner of the San Francisco *Examiner,* and nine years later bought *The Journal,* (now *The American*), and *The Evening Journal* of New York. Two other newspapers, *The Chicago American* and the *Examiner,* he later established, and today owns eight daily papers in various parts of the country. He has been active in political affairs, having served in Congress as representative of the Eleventh New York Congressional District for two terms and acted as president of the National League of Democratic Clubs. He was a candidate for the presidential nomination on the Democratic ticket in 1904, but failed of election, and the next year was likewise unsuccessful as candidate of the Municipal Ownership party for mayor of New York City. He was the candidate of the Democratic party for governor of New York in 1906, after being nominated by an independent party of his own creation, but lost the election.

Hearst, Sir William Howard (1864-), a Canadian statesman, was born in Bruce County, Ontario, and acquired his education at Collingwood Collegiate Institute and at the University of Toronto. Called to the bar in 1888, Mr. Hearst began practice in Sault Sainte Marie, and in 1895 was appointed agent and counsel in connection with the guarantee loan to the Lake Superior Corporation. He resigned this position in 1908, and in the same year was made King's Counsel. Also in 1908 Mr. Hearst was elected to the Ontario legislature. He was anxious that the resources of northern Ontario be developed, and while in the legislature and afterward he strongly urged such development. In 1911 he was made minister of lands, forests and mines, and in 1914 became premier of Ontario. In the latter capacity Mr. Hearst displayed great administrative ability. He was knighted in 1917, receiving the knighthood of St. Michael and St. George (K. C. M. G.).

Heart, the muscle that forces the blood to circulate. In man it is a cone shaped organ lying apex downward in a slanting position in the left side of the chest between the lungs. The point of the heart is opposite the space between the fifth and the sixth ribs. The base is opposite the second rib. It is a strong muscle with four cavities—two receiving and two expelling. The blood of the body drains into one side of the heart and is forced through arteries into the lungs. From the lungs it draws back into the other side of the heart and is squeezed out or driven to all parts of

the body only to drain back as before. For an account of the auricles, ventricles, veins, and arteries, and especially of the valves which guard the doorways and prevent the backset of the blood, though permitting it to go forward, a physiology should be consulted.

The heart is about the size of its owner's closed fist. Its action is due, it is held by high authority, to the influence of the blood upon the muscles. An accumulation of blood seems to exert an influence, electric or nervous, or whatever it may be, upon the muscular wall of the heart, causing a powerful spasmodic contraction which brings the walls of the cavity together and drives the blood out upon the next stage of its journey. The left side is the larger and more powerful, being charged with the circulation of the blood in the system.

The contractions or beats of the heart are made at the rate of about seventy-two per minute. Some idea can be had of the work it must do when we recall that the blood weighs about one-twelfth as much as the entire body, and that it is pumped over and over, the entire amount passing through the heart in from fifteen to thirty seconds. It is hard to realize that while one slowly counts thirty, the blood has run swiftly from one's great toe to the heart, been pumped to the lungs, purified, drained back to the heart and driven to the great toe again, nor should it seem surprising that the action of the heart and the circulation of the blood were not understood by the most skillful surgeons until long after the discovery of America, not in fact till the more important American colonies were well underway.

The heart of cold-blooded animals is comparatively small and feeble in action. The heart of the frog has two auricles and but one ventricle; that of the fish one auricle and one ventricle.

See HARVEY; LYMPH; BLOOD; CIRCULATION.

Heart of Midlothian, The, a novel by Sir Walter Scott, published anonymously in 1818. It is one of the twelve social novels, as opposed to the greater number of Scott's novels, which are historical. *The Heart of Midlothian* is one of the second series of *Tales of My Landlord.* The novel takes its name from the Tolbooth, the old jail of Edinburgh, which was at one time called the "Heart of Midlothian." The introduction explains how the schoolmaster, Mr. Peter Pattieson, writes the story after a conversation with certain guests at the Wallace Inn about the old Tolbooth. After Mr. Pattieson's death, the story, with others, is published by Jedediah Cleishbotham. The book has fewer characters, a smaller variety of incidents, and less description of scenery than any other of Scott's novels. It is nevertheless ranked by some readers as the best story on the list. The scene is laid in the time of the Porteous Riot in Edinburgh during the reign of George II. The most striking figure of the tale is Jeanie Deans, a peasant girl. Her good sense, her simple nobleness of mind, her heroic devotion to her erring sister, have made her one of the best known and most universally admired heroines of fiction. She is one of Scott's greatest creations.

> This tale will not be told in vain, if it shall be found to illustrate the great truth that guilt, though it may attain temporal splendor, can never confer real happiness; that the evil consequences of our crimes long survive their commission, and, like the ghosts of the murdered, forever haunt the steps of the malefactor; and that the paths of virtue, though seldom those of worldly greatness, are always those of pleasantness and peace.—From *Heart of Midlothian.*

Heat, a form of molecular motion. According to the theory of heat, every molecule in a substance is moving to and fro. The hotter a substance, the more violently the molecules bound back and forth. If they begin to subside and swing more quietly in their places, we say that the substance is cooling. The change from a solid to a liquid or to a gaseous condition is thought to be due to the violent jostling of molecules, whereby they get beyond each other's attractive influence. An increase of heat is accompanied by a closely corresponding increase of volume. This increase of volume varies for different substances. Lead and zinc, for instance, increase and shrink more rapidly than iron. The amount of heat required to make, let us say, a pound of a substance too hot to handle varies greatly. Marble and aluminum require the application of seven times as much heat as lead

and gold to bring them to the same temperature. Tin heats up ten times as fast as ice, and alcohol nearly twice as fast as water.

A proper degree of heat is one of the necessary conditions of all life. So far as the earth is concerned, all heat is derived from the sun. Even the heat obtained from fuel and chemical action comes originally from the sun. Winter clothing is designed to prevent heat from leaving the body. Some substances conduct heat more readily than others. Wool is a poor conductor. Cotton is better. Wool feels warm to the body because it does not carry away heat —really because it remains cold. The heat of the body requires to be maintained by eating food containing fat or some form of carbon.

In attempts to investigate heat, scientists have ascertained with reasonable certainty that in freezing air the distance to which a molecule can dart before bumping into another is so short that a quarter of a million such trips, end to end, would make only an inch in length; but that a molecule darts backward and forward often enough to travel over a quarter of a mile per second. The further statement is made that each molecule of air, that is at freezing, is run into at a rate of 5,000,000,000 collisions per second. In the case of heated air, these figures must be increased.

According to this theory the amount of heat in a body is the amount of molecular motion. The more a body cools, the less its molecular motion, until at 273 Centigrade degrees below freezing, all molecular motion ceases. This temperature is written —273°C., and is called the absolute zero. This theoretical temperature has never been reached, but scientists claim to have come within fourteen centigrade degrees of it. Prof. Dewar has succeeded in reaching a temperature of —443°F. The highest temperature yet attained is thought to be that of the electric arc, or 3,500°C.

Heat may be changed into light and electricity. It is in turn produced by them. Our great source of heat, light, and electricity is the sun. Whether they travel to us separately or whether they are three manifestations of the same energy is not yet understood, but is under investigation. It is believed that solar heat will one day do much of the work now done by coal, wind, and water. Solar mills, constructed somewhat on the windmill plan, but consisting of huge tin mirrors to catch heat, are already in use to drive machinery. Ericsson states that one-half square mile of Arizona sun has energy enough to drive 64,800 steam engines of 100 horse power each.

When a substance burns—combines with oxygen—heat is evolved; when iron rusts, heat is evolved; but the amount is too slight for measurement. When a combustible substance burns, it generates a definite amount of heat. Two pounds of petroleum, conditions remaining the same, produce twice as much heat as one pound. A pound of burning petroleum, however, produces more heat than a pound of coal. The unit of measure now in common use is the British Thermal Unit or B. T. U., which may be defined as the quantity of heat required to raise the temperature of one pound of pure water one degree Fahrenheit, at or near its point of greatest density. This point of greatest density is approximately 39.1° F. We can measure the amount of heat produced by means of an instrument called a calorimeter. To secure such a measurement, a definite amount of material is burned in the calorimeter in such a way as to raise the temperature of a surrounding quantity of water. The change in temperature of the water can be accurately determined by means of a very delicate thermometer. By repeated trial with the calorimeter, the amount of heat yielded per pound of fuel has been approximated. The heat for several kinds of fuel is per pound:

Fuel.	B. T. U.
Carbon	14,600
Hard coal	14,900
Soft coal	14,000
Lignite	12,000
Dry peat	10,000
Oak wood	5,000
Long leaf pine	9,000
Dry tan bark	6,000
Dry straw	6,000
Petroleum	20,000
Natural gas	30,000
Hydrogen	62,000

See CLOTHING; FOOD; THERMOMETER; EXPANSION.

Heath, an open, uncultivated, usually desolate tract, covered at best with small

shrubs and scanty pasturage. The term is in common use in Great Britain; the corresponding word for a grove or copsewood is holt. The characteristic shrub of a Scottish heath is the common heather or ling, which gives its name to the heath family known to botanists. It is akin to our blueberries. Heather grows knee or even shoulder high to a man. Cattle browse on the young shoots. Toward the end of August its spikes of bloom give the dry hillsides and the bogs of Scotland a beautiful lilac-rose color.

> For heath-bell with her purple bloom
> Supplied the bonnets and the plume.

The flowers are fragrant and yield an abundance of honey. At this season, bee keepers transport their hives to the hills that the bees may gather honey at short range.

Heath is used also in place of straw to thatch huts. Laid in close order with the tips outward, shingle fashion, ling makes a fragrant bed like that made by the American tenter from spruce boughs. Other plants of the heath family cover immense tracts in the Mediterranean region, South Africa, Siberia, Australia, and North America.

In addition to the name of the plant just described, a large number of words have been coined from heath. First of all, heathen are those who lived far out in the wild heaths remote from church and school, hence pagans. Heather-bells are the delicate pendent flowers of two plants closely related to heath and growing in similar localities. Heath-cock, heath-hen, heath-bird and heath-fowl all refer to the black-cock or moorfowl, corresponding to our prairie chicken. The terms heath and heather are used also as descriptive of a number of small birds, as the heather-lintie, or linnet, the heather-peeper or sandpiper, and the heath throstle or ring ouzel.

See BROOM; GORSE.

Heather. See HEATH.

Heating and Ventilating, supplying heat and pure air. Primitive man was satisfied with a fire of sticks built in the open air. Even after the invention of huts and tents the only source of heat was a fire built in the center with an opening above to allow the escape of smoke. The American Indian had no other means of heating. The council fire of the Iroquois was built in the center of a large wigwam. The cliff dwellers of New Mexico built a central fire in the assembly or men's room. Where wood was not to be had they used buffalo "chips" or the dried stalks of weeds. The Eskimo, living in a region where there was no wood, converted a block of soapstone into a rude lamp. A twisted bit of moss served for a wick. The blubber of the seal furnished fat for fuel.

The ancients depended entirely on open fires. To avoid the discomfort arising from smoke they devised the plan of charring wood and using charcoal for inside cooking and heating. In art, the aged Roman is represented warming his fingers over a pan of live coals. The open pan, pot, or kettle in which to burn charcoal is called a brazier. Even the wealthiest Roman or Greek had no other plan of heating. The brazier is in universal use in China, Japan, and many parts of India. It is still the chief dependence of the Italian. In fact, it is common in the Mediterranean countries. Many Spanish cities, and even some in South America, cook and heat with the brazier.

The fireplace was a distinct advance over the floor fire of the savage. It consisted essentially of a small chamber or cubby-hole at one end of the room, furnished with a chimney for the escape of smoke. In wooden houses the construction of the chimney was of especial concern. It was built necessarily of masonry laid with care to prevent fire from reaching the woodwork. The fireplace is supposed to have been invented in the wooded regions of western Europe. English colonists brought the idea of a fireplace with them to this country. The Virginian house in which Washington passed his boyhood had two large outside fireplaces, one at each end. They were built of limestone and mortar. Very frequently the colonial fireplace was built of bowlders or other loose stones. The chimney was built of sticks laid four square, plastered inside with mud or mortar. These chimneys were a constant source of danger through fire. The fireplace, with a crooked, swinging, iron crane for supporting the housewife's kettle, and andirons for holding fuel in place. are of frequent mention in

literature. A very good account of the New England fireplace may be read in Whittier's *Snowbound*.

The fireplace was succeeded by the stove. The stove of continental Europe is still a large structure of masonry, having a small cavity within in which fuel may be burned. Once a fire is started and the interior filled with live coals, the door is closed. It takes hours for a tile stove of this sort to heat up. It cools off slowly, giving out in the meantime a gentle, agreeable heat. Iron stoves were an invention of the eighteenth century. They are too well known to require description.

No attempt was made to heat the colonial hall, church, or meeting house. Feeble people carried foot stoves or foot warmers of some description. Public buildings and large residences are now heated chiefly by means of furnaces, steam, or hot water. Stated in simple terms, a furnace is merely a large stove in the basement. The firebox is inclosed in a jacket of metal or brick work. An intake pipe conducts fresh air to the space between the firebox and the jacket. The air is heated and is conducted through pipes to the various apartments above. The air does not "rise" through these pipes, but it is driven up by atmospheric pressure from outside acting through the cold air intake. In order that atmospheric pressure may work successfully, air must be allowed to escape from the rooms. A furnace is affected in its action by the direction of the wind; but on account of its low cost of installation, and because it combines ventilation with heating, it is deservedly popular.

Heating by steam has been reduced to a science. Steam is generated in a boiler. It is conducted through an iron pipe to the place where it is required, where the steam is admitted to a mass of short iron pipes, known as a radiator. When the radiators are placed in the apartments that are to be heated, the system is said to be direct. When the radiators are massed in a hot air chamber and the heated air is distributed, the system is said to be indirect. Most engineers prefer to combine the two systems. If the unit of heat be defined as the amount of heat necessary to raise the temperature of a pound of water 1°F., engineers expect a square foot of radiating surface to give off 250 units of heat per hour. By taking into consideration the size of the room and climate, steamfitters know how much radiation to provide. In the cold winter climate of Minnesota the following order may be taken as a guide: Divide the area of the glass windows by 2; the area of the outside wall by 10; and the cubical contents of the room by 200. The sum of the three results in the radiating surface required.

Steam distributes itself by reason of its own pressure, of course. Steam gives off an enormous amount of heat in cooling. A pound of steam gives off 536 heat units in the mere change from steam to hot water. Each radiator must be provided with a return or drain pipe through which the water of condensation may drain back to the boiler. In starting a steam plant it is necessary to open a vent in each radiator so that the confined air may escape, or else the steam cannot enter. As soon as the air has been driven out and the radiator has been filled with steam, the vent should be closed. There is no further advantage in allowing a small amount of hissing steam to escape. When the steam plant is closed down for the night the vents should all be open in order that air may enter the radiators as fast as the steam condenses into water. Otherwise the condensing steam forms a vacuum and the steam in the upper part of the boiler drives the water of the boiler up the returns into the radiators.

The hot water heating plant is very similar to the steam plant. Both pipes and radiators are filled with water. As the water in the boiler heats, the colder, heavier water in the radiators settles downward, establishing a circulation throughout the entire system. In this way the warm water of the boiler reaches the radiators, warms the rooms, and returns to the boiler to be reheated. An elevated standpipe with an open upper end permits free expansion and prevents an explosion.

All in all, hot water supplies the most agreeable and even sort of heat. A foot of radiating surface gives off about 180 units of heat per hour. A greater radiating surface is needed than for steam. A hot water plant costs rather more to begin with, but

it can be operated with a lower fire and, up to a certain limit, at less cost. Once a hot water plant is heated up, however, it is like the old continental style of stove; it takes some time to cool it off. Steam can be shut off at once.

Boise, Idaho, enjoys a unique system of hot water heating. A deep well furnishes a supply of hot water from subterranean sources. By means of mains and house pipes, a central plant furnishes hot water for heating purposes throughout the entire city. Cities situated near the natural gas belt, as Columbus and Indianapolis, are heated with gas. Hundreds of miles of mains and house pipes introduce the natural gas from oil fields into the public buildings and residences of these cities. The gas is consumed usually in what appear to be small fireplaces. Tongues of flames playing over andirons and castiron logs of the most natural appearance imaginable give apartments the cheerful, open-fire effect of an old-fashioned wood fireplace.

Electric heat is used in the arts, as in welding metals and the like. Electricity furnishes a very agreeable domestic heat, but it is too expensive for general use. Engineers consider that an efficient steam or hot water plant converts three-fifths of the possible energy of coal into available heat. The most economical electric plant thus far constructed turns only one-eighth of the energy of coal into available heat.

Ventilation is entirely a modern problem. Primitive man, the sport of the winds, may be said to have had too much ventilation. The most expensive buildings of the ancients were built without glass. The windows of the Taj Mahal are closed with marble screens only. The wonderful buildings of Egypt, Greece, and Rome were provided with unclosed openings. In the countries where braziers are used, the climate is mild enough so that the walls of houses are of slight construction. Even the snow igloo of the Eskimo, heated as it is by burning blubber in a stone lamp, is not without ventilation. Air passes through the snow walls, it is said, quite freely.

With the introduction of close windows and the construction of practically air-tight wooden and masonry buildings, ventilation, especially in the northern part of the world, has become a problem of importance. It is a well established principle of physiology that air once breathed should not be breathed again. While in the lungs it loses a quantity of oxgyen and absorbs a quantity of carbon dioxide which renders it positively useless when breathed again. When the hot air chamber of a furnace is fed with pure outdoor air, the air in the rooms heated undergoes a change. Experience shows, however, that furnace ventilation is only partial. On the whole, it is very unsatisfactory. A furnace system of ventilation can be made fairly efficient, however, by providing large foul air ducts. In case of steam heat a radiator located in each duct insures fairly satisfactory ventilation. Too many builders make the foul air escape about one-fourth as large as it ought to be.

For churches, schools, lecture halls, and other rooms where many people congregate, the only system found satisfactory is that known as fan ventilation. According to this plan, outdoor air is admitted to a chamber. Here it is heated by steam or hot water. A large fan constructed usually on the principle of a steamship propeller with blades like the sails of a windmill, rotates rapidly in a tube and forces the fresh, warm air through pipes to the various parts of the building. In a complete system, a second fan in the attic draws foul air out of the building. Sometimes the fan is driven by steam pressure from the boiler which supplies heat. It is better, however, to operate the fan by means of an independent gasoline engine or dynamo. Such a system can be depended upon to furnish pure air in all kinds of weather. Engineers lay down the rule that the pure air inlet should have a sectional area, at its smallest point, of not less than one square foot for each fifteen persons.

Medical authorities maintain that an adult in good health should be provided with 30 cubic feet of pure air per minute. While this claim may be excessive, it is very evident that, even at increased expense of heating, ventilation should receive attention. It is said that a person can live three weeks without food; three days without water; and three minutes without air.

The following pertinent excerpt is taken

from a circular of instructions issued by W. W. Walling, chief factory inspector of New York, to his deputies:

Ventilation as commonly understood means the removal of foul and the introduction of fresh air, and in many cases it includes the idea of a thorough mixing of pure with impure air, in order that the latter may be diluted to a certain standard. According to Dr. John S. Billings, perfect ventilation means that any and every person in a room takes into his lungs at each respiration, air of the same composition as that surrounding the building, no part of which has recently been in his own lungs or those of his neighbors, or which consists of the products of combustion generated in the building, while at the same time he feels no currents or drafts of air and is perfectly comfortable as regards temperature, being neither too hot nor too cold. . . .

Expired air contains five per cent less oxygen and a little over four per cent more carbonic acid gas than that which is inhaled. Carbon dioxide, better known as carbonic acid gas, is commonly considered a poisonous gas in the atmosphere, but this is hardly true, as large quantities can be breathed with impunity when pure and mixed with air. It will not support life, and by shutting out the required amount of oxygen it produces asphyxia. We need ventilation because we have to breathe, because every breath uses up and spoils a certain amount of air. A person will drown in one or two minutes, in vitiated air, because good air is kept out of the lungs. Sleeping in a room wherein an open charcoal fire is burning produces the same results as drowning and has been frequently used by those with suicidal bent. In this connection is always cited the famous instance of the Black Hole of Calcutta. This was a room about eighteen feet square, and during the Sepoy Mutiny of 1857, 146 Europeans were incarcerated for a night. Although the room had two small windows, 126 men died during the night, while the survivors lived but a short time. Another case is that of the steamer "Londonderry," which was overtaken by a storm in the Irish Sea. The 200 passengers were ordered below and the hatches battened, when, before their suffering could induce the captain to set them at liberty, seventy-two had died of suffocation. While these are extreme cases, causing almost instant death, impure air produces slow poisoning, and is too frequently the direct cause of consumption and its accompanying diseases, bronchitis, catarrh and pneumonia, while diphtheria, measles and various fevers are promoted by it. The immediate effect of breathing impure air, one experienced by each of us, is a feeling of stupor, inactivity, drowsiness, languor and sometimes headache, vertigo and nausea. Little dependence can be placed on the sense of smell as an agent in detecting foul air, as no other organ is more easily deadened by excessive action than the nose. The oppressive, sickening, ofttimes nauseating odor that greets one upon entering an illy ventilated room is scarcely noticed after a few minutes. Not until the return to the pure air is the foul atmosphere a subject of thought. It has been aptly said that "He who lives in a garden cannot smell a rose, while the woodcutter in the southern forests is insensible to the odor of the magnolia." Stepping into a closed bedroom where a person has slept all night, the smell is often intolerable, while the person who occupied it detects nothing unusual. The peculiar odor common to churches, noticeable upon entry, is forgotten by the time one reaches his pew. It is therefore obvious that the sense of smell is not sufficient to warn us of danger in atmospheric conditions and that other means have to be adopted. The safest and most practicable method is that of measuring the carbon dioxide. While not itself particularly dangerous, carbon dioxide is usually found in very bad company and its presence indicates with much certainty the presence of those really offensive and dangerous gases and impurities which are a menace to life and health. In large factory buildings, heating and ventilating are almost inseparably connected, still there is scarcely a factory in New York where any provision is made for proper ventilation. In order to heat a building with the greatest economy, windows and doors are made as tight and close-fitting as possible consistent with opening, and in many cases the only pure air entering a building is that which finds its way around windows and doors.

An old writer said: "When men lived in houses of reeds they had constitutions of oak; when they live in houses of oak, they have constitutions of reeds."

Whenever the introduction of sufficient air reduces the temperature of the room to an uncomfortable degree, it is obvious that the ventilation and heating systems must be combined. I believe we are justified in demanding a system that will furnish, in ordinary trades, a minimum of two thousand cubic feet of fresh air per hour for each person, and the removal of the same amount, which supply under no circumstances should fall below 1,500 cubic feet per hour.

Heaven, in theology the abode of Deity, and of the souls of just men after the death of the body. The etymology of the word heaven is uncertain, but it is believed to be related to the word heave, and has probably the significance of heaved up or elevated, in reference to the idea that God dwelt in regions above the earth. In the most ancient times of which we have any knowledge, the belief existed that the spirit of man survived bodily death. That this spirit should inhabit the realms of Deity was an idea developed gradually among the Jews, and accepted in its completeness only with the teachings of Christ. Just as there are many forms of religious belief, so there are many different conceptions of heaven, in fact every individual colors with his own imagination what he is taught of this idealized abode.

There is a marked tendency in recent

years to lay aside the more materialistic views of heaven which have long prevailed, in favor of the conception of a realm whose joys are purely spiritual. Milton in *Paradise Lost,* Dante in *The Divine Comedy,* Bunyan in *Pilgrim's Progress* have given us pictures of heaven as they have conceived it. Among more recent writers, Mrs. Oliphant in *A Little Pilgrim,* Mrs. Florence Morse Kingsley in *Intra Muros,* and Elizabeth Stuart Phelps in her well-known series, have done the same. Highly imaginative and idealistic as these various conceptions are, they are all more or less material. Perhaps no one has treated the subject from so spiritual a viewpoint as has Emanuel Swedenborg, the Swedish theologian and seer, who, in *Arcana Cœlestia,* that is "Celestial Mysteries," tells of "Heaven and its wonders, the world of spirits, and hell, from things heard and seen."

Heaves, or "broken wind," is a disease of horses, caused, it is thought, by ruptured air-cells in the lungs. Horses affected with it have a bad cough, particularly noticeable after heavy exertion, when the eyes become blood-shot and the horse breathes with difficulty. Draft horses are more likely to suffer from heaves if fed on poor and bulky food. Green grass, wet hay and good oats are best as a preventive or as a palliative. No cure is known.

Hebe, hē′bē, the goddess of youth. She was the daughter of Zeus and Hera, and was cupbearer to the gods. She was a type of health and beauty. Hera gave her to Hercules in marriage. According to one account, she resigned her office in consequence of a fall; according to another, she ceased to give the gods their wine after she had become the wife of Hercules. She was succeeded in the office of cupbearer by Ganymede. The name of Hebe is symbolical of exuberant and beautiful youth.

Heber, Reginald (1783-1826), an English bishop. He was a graduate of Oxford, and held various pastorates in England. In 1822 he was made bishop of Calcutta. His diocese included all India. He interested himself in providing educational facilities, especially the College of Bishops at Calcutta. He was a man of industry and unaffected piety, with a poetic turn of mind. He is best known to the western world as a writer of hymns, over fifty of which appear in modern collections. The most noted of his hymns are *Holy, Holy, Holy,* and the well known missionary hymn, beginning:

From Greenland's icy mountains,
From India's coral strand,
Where Afric's sunny fountains
Roll down their golden sand,
From many an ancient river,
From many a palmy plain,
They call us to deliver
Their land from error's chain.

Hebert, Louis Philippe (1850-), a noted Canadian sculptor, was born on a farm in the province of Quebec. It is said that he first attracted attention with wood carvings made during idle moments, and was put to school in the studio of M. Bourassa at Montreal. Later, he studied for a year in Paris, and soon after his return to Canada won a prize offered by the Dominion government for the best statue of Sir George E. Cartier. This statue now stands in Parliament Square at Ottawa, together with Mr. Hebert's Queen Victoria, Macdonald and Mackenzie monuments. Other notable works by Mr. Hebert are the Laval Monument, at Quebec; the Howe Monument, at Halifax; the Champlain Monument, also at Quebec; and the Maisonneuve Monument at Montreal.

Hebrews. See JEWS.

Hebrews, Epistle to the, one of the most important epistles of the New Testament. Its authorship has been in question in both ancient and modern times. The Greek fathers generally attributed this epistle to St. Paul, and this opinion prevailed in the East as well as the West until the Reformation. Erasmus, Calvin, Luther and others revived the old doubts, however. The Council of Trent gave a decision in favor of St. Paul, but in protestant countries the question is still held to be debatable. Martin Luther suggested Appollos as a possible author, and this has been shared by many biblical scholars since that time.

The epistle was addressed to the Jewish converts to Christianity, especially those residing in Palestine. There is evidence that these Christians were in danger of be-

ing seduced or persecuted to return to Judaism, and the epistle was designed to keep them steadfast.

Its canonical authority was accepted in the early Church by those who doubted that Paul was its author, but its integrity has never been questioned.

Hebrides, hĕb′rĭ-dēz, or the Western Isles, an archipelago off the west coast of Scotland. There are about four hundred islands in all, including uninhabited rocks. The total area, 2,800 square miles; population, 79,159. They are attached politically to four counties of Scotland. The best known of the islands are Lewis and Harris and Skye. Skye is noted for the skye-terrier, a small long-haired dog the size of a poodle. The inhabitants are engaged largely in fisheries. The language of the people is Gaelic. Oats, barley, and potatoes are raised. Cattle, small horses, and small sheep are reared. Butter, fish, and wool are sent to market. A large part of the land is occupied by sheep farms. There are grouse, moose, and deer ranges of considerable extent. Scott celebrates the Hebrides in his *Lord of the Isles.* The Hebrides were less known than the Fiji Islands until the visit of Dr. Samuel Johnson in 1773. In the summer season the islands are visited not a little by tourists, chiefly from Glasgow. See JOHNSON, SAMUEL; BOSWELL.

Hebron, an old city of Palestine, belonging to the tribe of Judah, is 21 miles from Jerusalem. Its ancient name was Kirjatharba. The modern town, El Khalêl, has about 10,000 inhabitants. It is situated in the picturesque Valley of Eshcol, which has always been famous for its grapes, olives and other fruits. On the spot where Abraham is said to be buried is a mosque, called *El-Haram* (sanctuary), built to enclose the cave which is said to be the place of burial of Abraham, Isaac and Jacob, and their wives.

Hecate, hĕk′ā-tē, in Greek mythology, one of the deities of the lower world. She was the daughter of a Titan and Night. Her worship was connected chiefly with caves. Even the temples built in her honor were placed at the entrance of a subterranean chamber. Hecate was intrusted by Zeus with the magic powers of heaven, earth, and sea. She might be cruel, or she might be kind. She had the power of bestowing good and of averting evil, or of bringing misfortune. People of rank erected her image in front of their houses. It was placed frequently at the crossings of roads where, at the new moon, offerings of food were presented, and left for the consumption of poor people. In statuary, Hecate appears in a hideous form. Three heads and three pairs of arms spring from the same body. Serpents issue from the drapery at her feet and are twined in her hair. She bears a lighted torch and a sword in her hand, and is accompanied by two black, shaggy dogs. When placed at a crossroad, the three heads were usually those of a horse, a lion, and a dog. The three heads are doubtless symbolical of the three-fold nature which was ascribed to this mysterious goddess, her powers extending to the heavens, to the earth, and to the under world. It was probably on this account that she became variously identified with Selene, goddess of the moon, with Diana, goddess of the chase, and with Persephone, goddess of the lower world. As a deity, Hecate was the goddess of witchcraft and sorcery. It was she who sent demons and phantoms to hover about spots where murder or other hideous crime had been committed. In *Macbeth,* it may be remembered, the guilty king speaks of "pale Hecate's offerings."

Hecatomb, a Greek word meaning literally a hundred oxen. In the worship of the Greeks it was customary to sacrifice a large number of animals, preferably oxen. The legs and certain portions of the intestines were wrapped in fat and burned on the altar. The remainder of the carcass served for a feast which came at the conclusion of the religious ceremony. While the sacrifice by no means required the full number of oxen, and might, indeed, be performed with other animals, it is needless to say that the prospect of a bountiful feast led the populace to regard the full number of one hundred oxen with favor. A man of wealth hardly deemed it consistent with his social standing to tender the priests a smaller number. Hecatomb

has passed into popular use, rather inappropriately, to designate a sacrifice of human life, as in case of a railroad accident and the burning of a ship at sea, or an assault on a fortress. See BARBECUE.

Hecla, a mountain of Iceland. One of the most celebrated volcanoes in the world. It is almost a mile high, and has five craters. Eighteen eruptions are on record. The last occurred in 1845. In 1783 a stream of lava fifteen miles wide and forty-five miles long was thrown out in a single eruption. Mt. Hecla stands alone on a plain about twenty miles from the sea. See ICELAND; VOLCANO.

Hector, the hero of the Trojan army. He was the son of King Priam and Hecuba. His wife was Andromache, the daughter of the king of Thebes. While Achilles, the Greek, was sulking in his tent, refusing to fight, Hector slew Archilles' dearest friend, Patroclus. This aroused Achilles, who presented himself at the head of his men and rushed into the thick of the fray. Achilles slew Hector with his own hand, tied him by the feet to the tail of his chariot, and dragged him around the walls of Troy. In his grief the aged King Priam went in person to the Grecian camp and begged the boon of his son's body. This he received and took back to the beleaguered city, where Hector was buried with great pomp. Our account of Hector is derived from Homer's *Iliad*. Homer writes as a Greek, yet the valor and manly qualities of the Trojan Hector arouse the poet's admiration. See ACHILLES; TROY.

Hecuba, hĕk′ū-ba, in Grecian legend, the second wife of Priam, king of Troy, and the mother of Hector. She had many children. She lost all her sons by the Trojan war. They were all slain with the exception of Helenus, who deserted and joined the Greeks. Hecuba saw the body of Hector dragged around the city by the victorious Achilles. After Achilles had been slain by Paris, another celebrated son of Hecuba, the mother must needs witness the death of her daughter Polyxena, who was sacrificed on the tomb of Achilles by whom she had been beloved. Paris himself was slain by one of the poisoned arrows of Philoctetes. The unhappy queen at last witnessed the death of her youngest son, Polites, and saw her husband murdered by the cruel Pyrrhus. She herself and her daughter, Cassandra, were carried away as slaves by the Greeks. On the coast of Thrace the body of Hecuba's only remaining son, Polydorus, was washed to her feet by the waves. He had been murdered by Polymnestor. Hecuba avenged this last woe by slaying Polymnestor. Then in her despair she leaped into the sea. According to some accounts the gods transformed her into a dog, in pity, but the dog sprang into the sea. The place where this occurred was called Cynossema, "the tomb of the dog." The story of Hecuba has furnished the subject for many Greek tragedies. The most famous of these is *Hecuba* by Euripides. Euripides represents Hecuba as a noble, virtuous woman and a tender mother, on whom fate has inflicted terrible sufferings. See TROY; HECTOR; ACHILLES; CASSANDRA.

Hedge, a fence of growing shrubs. The British Isles and northern Italy are famous for hedges. In many localities they are an entire substitute for stone walls and wooden fences. The hedgerows of the English and Irish countryside are the delight of tourists. The British hedge is formed usually of hawthorn. It has a strong spiny growth, quite sufficient to turn cattle. The hare escapes from its enemies by slipping through the hedges from one field to another; the hedgehog finds protection beneath the thorny branches. If it were not for hedges in which they nest and find refuge from hawks, many singing birds would be exterminated in parts of Europe. The planting and pruning of hedges is a trade in itself. The young plants are started in nurseries, and are set closely in a strip of well prepared ground. The shrubs require to be pruned annually in order to maintain a close, strong growth. A triangular cross section, like the sharpened gable end of a house, is considered the best, because it does not afford a lodgment for snow. In the United States the best substitute for fencing is the osage orange. Unfortunately, however, it winter kills north of a line drawn through Iowa and Illinois. Evergreen hedges are planted frequently as windbreaks. A large number of shrubs are planted to form orna-

mental screens, inclosures, and private grounds, borders for walks, and purely ornamental hedges. The crab, holly, privet, flowering maple, barberry, broom, willow, yew, box, arbor vitae, the honey locust, and the Cherokee rose are favorites for ornamental purposes.

Hedgehog, an insect-eating animal belonging to a family of several species. It is not related to the woodchuck or to the porcupine. The teeth are small and sharp —more like those of a shrew. The common hedgehog of Europe is about nine inches in length. Its upper parts are covered thickly with strong, sharp spines about an inch in length. When attacked or alarmed the little animal tucks its nose and feet in, and, by means of a peculiar set of muscles running along its sides something like the strings of a lady's handbag, draws the spiny portion of its hide together in such a way as to become a perfect globe, armed with spiny bristles at every point of the surface. It may be handled, or teased by dogs, for hours at a time, before it will open up or expose itself to its enemies. Its spines are so elastic that it may be thrown like a ball without suffering injury. In addition to insects, the hedgehog is not averse to birds, eggs, and even poisonous snakes, which it is able to eat, tail first, with the utmost satisfaction. The hedgehog feeds at night, and hibernates in the winter. There are no hedgehogs in America. See SHREW; PORCUPINE.

Hedge School, a term applied to the wayside schools of Ireland. See CARLETON, WILLIAM.

Hedin, von, vōn hĕd-ēn′, **Sven Anders** (1865-), a Swedish geographer and explorer of note. Stockholm is his birthplace. He studied there and at Upsala, Berlin, and Halle receiving his degree of Ph. D. at the last-named university. His first journey of exploration was made in 1885-6 through Persia and Mesopotamia. Four years later he was made Swedish ambassador to the Shah of Persia, and afterward traveled through Khorassan and Turkestan. In 1894 he set out on a three years' journey to Pekin through the desolate country of central Asia, returning through Mongolia and Siberia. In an expedition from 1899 to 1902 he explored much other Asian territory, crossing the Desert of Gobi and most of Tibet. A third important exploration was from 1905 to 1908 when he discovered the true source of the Indus and for the first time the sources of the Brahmaputra and the Sutlej, also establishing the fact that the Trans-Himalayan range, the most massive in the world, is continuous. Twice he made unsuccessful attempts to reach Lassa, the sacred Hindu city, but was prevented by the Tibetans who guard it jealously against intrusion by foreigners. On his last journey he succeeded with difficulty in securing an audience with one of the Grand Lamas, who permitted him to watch the Hindu sacred games. Dr. Hedin's account of this meeting in *Harper's* for August, 1907, is extremely interesting. His adventures have been many and hazardous. Four of his books are in English; *Through Asia,* which made his reputation in England and America, *A Journey Through Persia and Mesopotamia, King Oscar's Embassy to the State of Persia,* and *A Journey through Khorassan and Turkestan.* The results of his travel are of great value to science.

Hegel, hā′gel, **Georg Wilhelm Friedrich** (1770-1831), a German philosopher. He was born at Stuttgart, and received an elementary education at the schools of that city. He received his degree at the University of Tübingen in 1793. For want of a more lucrative employment he acted as a tutor in a family living near Berne, Switzerland. His diary gives an account of various delightful trips afoot in that region. From Berne he made his way to Frankfurt, where he accepted a similar position in the family of a merchant. In 1799 he inherited $1,000 from his father, with which he took his way to the University of Jena, at that time perhaps the most celebrated institution of learning in Europe. Here he secured permission to lecture in return for fees, and rose speedily to the rank of professor. During the Napoleonic wars the university was impoverished and the students scattered. Hegel was forced to accept a position as the editor of an unimportant paper. In 1808 he was made rector of the gymnasium of Nuremberg—principal of the high school we should say. Here he

married happily, and lived on an income of $650 a year. In 1816 he was offered a professorship of philosophy at the University of Heidelberg. Two years later he accepted a similar professorship at the University of Berlin, a position which he held with renown until the time of his death.

Hegel was considered a progressive, fearless thinker. His classrooms were thronged by students who spread his fame throughout Europe. He is described as having a plain, old-fashioned face, furrowed with thought. When lecturing he sat with his snuff box within convenient reach of one hand, while he turned his notes with the other. His utterance was slow. He seemed to struggle for words and at times would make little progress, yet the student needed to be constantly on his guard, lest the lecturer glide away with unexpected ease of movement and the connection be lost. He died from an attack of cholera.

Hegel was a voluminous writer. His complete works fill eighteen volumes. Among them are a *Life of Christ,* an *Encyclopedia of the Philosophical Sciences, The Science of Logic, Lectures on Aesthetics, The Philosophy of Right, The Philosophy of Religion, The Philosophy of History,* and *The History of Philosophy.* Hegel's writings present a complete system of philosophy, undertaking to explain the entire universe of thought and being, down to the minutest details. He occupies a large place in the history of German thought. His followers are known as Hegelians. See HERBART.

Hegira, hē-jī′ra, an Arabic word meaning the flight or departure. More particularly it is the date of Mohammed's flight from the holy city of Mecca, 622 A. D. The Mohammedans reckon time from the hegira, as we do from the birth of Christ. Their dates begin 622 years behind ours. In order to change from one time to the other, it is necessary to make an additional allowance for the shortness of the Arabic year, which consists of lunar months. See MOHAMMED; CALENDAR.

Heidelberg, hī′dl-bûrg. See BADEN.

Height, or Stature, the distance between the sole of the foot and the crown of the head. The following table of the average height of adult males for different peoples and nationalities is compiled from a report made to the British Association in 1883. The average stature for the table is 65.25 inches. Men get their full growth at twenty-three years, women at twenty. The exceptions to this rule are usually dwarfs or persons of interrupted growth. At thirty months the child has half the height of the adult.

	Inches.
Polynesians	69.33
Patagonians	69.00
Negroes of the Congo	69.00
Scotch	68.71
Iroquois Indians	68.28
Irish	67.90
Americans	67.67
English	67.68
Norwegians	67.66
Zulus	67.19
Welsh	66.66
Danes	66.65
Dutch	66.62
American negroes	66.62
Hungarians	66.58
Germans	66.54
Swiss	66.43
Belgians	66.38
French	66.23
Berbers	66.10
Arabs	66.08
Russians	66.04
Italians	66.00
Spaniards	65.66
Eskimos	65.10
Papuans	64.78
Hindus	64.76
Chinese	64.17
Poles	63.87
Finns	63.60
Japanese	63.11
Peruvians	63.00
Malays	62.34
Lapps	59.20
Bosjesmans	52.78

See GIANT; DWARFS; PYGMY; WEIGHT.

Heilprin, hīl′prĭn, **Angelo** (1853-1907), an American scientist and traveler. He was born in Hungary, but was brought to the United States when three years old. His education was finished in the universities of London, Geneva and Vienna. Upon his return to this country he was made professor of geology and paleontology at the Philadephia Academy of Natural Sciences. During his sixteen years in this position he made extensive travels through Mexico, Florida and the Bermuda Islands, climbing their highest volcanoes and making a thorough study of the geology of each section. He it was who in

1892 led the Peary relief expedition, and who in 1902 ascended Mount Pelee in Martinique while the volcano was still in eruption. He has written of his travels in *The Earth and Its Story;* others of his works are *The Geological Evidence of Evolution, The Geographical and Geological Distribution of Animals* and *The Principles of Geology.*

Heimskringla, a history of the Norse kings written by the Icelandic Snorre Sturluson. It receives its name, which means "the circle of the world," from the first words of the manuscript. It begins with the earliest mythical times and closes with the battle of Re in 1177. It describes the establishment of the kingdoms of Norway, Sweden, and Denmark; gives accounts of the Viking expeditions; of the discovery of Iceland, Greenland, and America; and of the conquests of England and Normandy. The first part of the Heimskringla is, of course, traditional; the last part is regarded as authentic history. Both for its historical value and as a work of literature, it is the most important prose work in Old Norse literature. It includes every species of saga composition.

Heine, hī'neh, **Heinrich** (1799-1856), a German poet. He was born at Düsseldorf of Jewish parents. He received his education in the gymnasium of his native town. He took special interest in English and French. *Gulliver's Travels* was, he states, the favorite book of his boyhood. He was an admirer of Napoleon, hailing him as the political Messiah of the day. A wealthy uncle, a banker of Hamburg, aimed to interest him in banking and commerce, but the young man had a light-hearted desire to travel and study. He was provided with the means to enter the University of Bonn. Here he appears to have had no definite plan in mind, but reveled in the delights of literature and history. From Bonn he went to Göttingen, but was expelled for some violation of the duelling laws. He then repaired to Berlin, where Hegel was lecturing. The social pleasures of the city appear to have engaged his attention, however, in preference to the duties of the university. He began to contribute poems to the various German periodicals. In 1822 a small volume of these was published. In 1825, in obedience to the wishes of his uncle, the banker, who had never ceased to provide him with funds, he returned to the University of Göttingen and took his degree in law. According to the rules then enforced he was required to forswear the Hebrew religion,—an act for which he has been much criticised, especially as he never took up the practice of law, preferring instead the profession of letters. A Book of Songs, *Buch der Lieder,* and Pictures of Travel, *Reise Bilder,* brought him reputation. He settled down at Munich for a time as the editor of a periodical. His editorial views were too little German and too much French to suit the German government. In 1831, in order possibly to escape life imprisonment, he fled to Paris, where he lived for the rest of his life. His collected works fill seven volumes. Heine is considered one of the greatest of German poets. His lyrics are to be found in every German reader. It is perhaps sufficient to establish his claim to immortality to say that he is the author of *The Lorelei.* The song describes a maiden wraith standing on a rock of the Rhine, charming boatmen with her singing, and making them so forgetful of their rowing that they are drawn into the rapids to their own destruction.

Heir. See INHERITANCE.

Hela, in Scandinavian mythology, the goddess of the lower world, which was called Hel or Helheim. The name Hela signifies death. She was a daughter of Loki. She is represented as a horrible creature, half black and half blue, who feeds on the brains and the marrow of human beings. She has dead women for her maids. Her table is called Famine and her knife Starvation. Hel or Helheim is so far from Asgard, the abode of the gods, that Odin's swift horse Sleipnir took nine days and nights to reach it. Helheim bears some resemblance to the Hades of the Greeks. A river, gloomy and desolate, flows through it, and the entrance is guarded by a fierce dog. To Helheim are sent the souls of all who die natural deaths, that is, from old age or illness. Far below Helheim is Anguish, the prison house of the wicked. Here Hela sends the souls of

sinners to be punished, assigning them according to their deeds to one of the "nine worlds."

Helen, in Greek legend, the most beautiful woman of antiquity. Her home was at Sparta. She was the daughter of Zeus and Leda. In girlhood, the hero Theseus ran away with her to Athens. Her brother Castor brought her back to Sparta. She was finally given in wedlock to Menelaus, the king. Paris, son of Priam, king of Troy, heard of her beauty, and, with the aid of the goddess Aphrodite, won her love and fled with her to Troy. Here she abode for twenty years. Menelaus, her husband, called all Greece to arms and precipitated the Trojan War. After the death of Paris, and ere the destruction and sack of Troy, she became the mate of the Greek warrior, Deiphobus. When Troy fell Menelaus escorted her with honor to her Sparta home. Of all the characters in Grecian legend Helen was the most beautiful, the most desired, and the least securely possessed. Even after death, so runs the story, her shade was mated with that of Achilles on the Stygian shore. See TROY; PARIS; MENELAUS.

Hel'ena, the capital of Montana and county seat of Lewis and Clark County. It is in the Rocky Mountains, surrounded by great mines of copper, gold, silver, lead, and zinc, for the products of which it is a great shipping point. The city itself sprang from a mining camp founded by four discouraged prospectors who named the gulch the "Last Chance," vowing that if it proved worthless they would give up their enterprise. Their first pan of gravel yielded twenty dollars in gold. In the next six years over fifteen million dollars in gold ore were found in the same spot. Now assay offices, concentrators, and great smelters cover the site of the old camp. There are found also machine shops, brick kilns, soap, tile, and carriage factories, breweries, flour mills, and lumber mills. Montana Wesleyan University, St. Aloysius College, the capitol, St. John's Hospital, the city, state, and other libraries, and the courthouse, are buildings of interest. In 1920 the population was 12,500.

Helenus, in Greek legend, one of the sons of Priam, king of Troy. He was celebrated as a prophet, and was the only son of Priam who did not lose his life during the siege of Troy. Foreseeing the fall of the city he deserted his countrymen and joined the Greeks. According to some accounts he did not do this of his own free will, but was led to it by the cunning of Ulysses, who wished to obtain the benefit of Helenus' prophetic power. Virgil represents him as having been taken to Epirus by the Greeks as a slave. He had then married Andromache, widow of his brother Hector; and the two, Helenus and Andromache, had become rulers of Epirus. Shakespeare introduces Helenus as one of the characters in *Troilus and Cressida.*

Heligoland, or **Helgoland,** a small island in the North Sea, a mile long, belonging to Schleswig-Holstein. Its population is about 2,000. It was taken from Denmark by Great Britain in 1807. Later Germany coveted it as a naval station at the entrance of the new Kiel Canal. Great Britain obligingly ceded it to Germany in 1890. It was a mistake. The Germans built up the crumbling coast, turned the island into a strong naval fort, and used it as a screen from which the German fleet might make surprise attacks in time of war. By edict of the Peace Conference the fortifications must be razed at the expense of Germany and the isle must remain unfortified.

Helios, hē′-lĭ-ŏs, in Greek mythology, the god of the sun. He was the son of Hyperion and Thea and brother of Eos (Aurora) and Selene. Sometimes he is called by his father's name. Homer's account of this god is very simple. Helios arises in the east, traverses the heavens, and descends into darkness and Oceanus in the west. The later poets have woven many fanciful ideas into their stories of Helios. According to these writers he dwells in a palace behind Colchis with his sister Eos. Each day he issues from the portals of the dawn and drives his splendid steeds across the sky. Having passed through the gates of evening, he cools his horses in the ocean and drives them into a marvelous golden bowl built by Hephaestus, which bears them along the northern shore of ocean back to Colchis. Helios sees all things, and occasionally has great influence

upon mortals by telling of some event which he has beheld. Helios came to be confounded with Apollo, but there was a marked difference in the original character of the two gods. Helios represents the physical phenomena of light, while Apollo stands for mental illumination. The Romans called the sun god Sol. The famous statue called the Colossus of Rhodes is supposed to have been erected in honor of Helios. White rams, goats, bulls, lambs, and especially white horses, were sacrificed to Helios. The cock that crows in the dawn was sacred to him.

Heliograph, literally "sun writing," a method of signaling that makes use of the sun's rays, reflecting them with a mirror or mirrors. The chief use of the heliograph is in military operations, though it has often been used for other than military purposes, as, for instance, by the United States Geological Survey in triangulation. A clear atmosphere is the prime requisite in long-distance signaling with the heliograph, which consists of a mirror or system of mirrors mounted on a tripod and fitted with a shutter that keeps the rays of the sun from the mirror at the will of the operator. The Morse system of dots and dashes is usually employed, though other codes have been devised. The heliograph was extensively used by the British during the Boer War. It is reported that heliographic messages have been flashed more than two hundred miles.

Heliopolis, "city of the sun," appears in the Bible under the name of On. It was a splendid city and a famous seat of learning situated in Lower Egypt near the apex of the Nile delta. The site is now occupied by the village of Matariah. Heliopolis was said by ancient writers to have been founded during the second dynasty, though Egyptian records seem to indicate that this date is too early. A great temple was erected here by Amenemhat I, before which his son, Usertesen I, erected two obelisks, one of which still stands. Thothmes III erected at Heliopolis the obelisks known as Cleopatra's Needles, of which one is now in New York City, the other in London. The priests of this city probably enjoyed a wider reputation for learning than did those of any other oriental city; Thales, Solon and Plato are said to have received instruction from them. Heliopolis declined under later dynasties, and at the beginning of the Christian era the city was practically deserted, and nothing but the obelisk erected by Usertesen now remains.

Heliotrope hē′lĭ-ō trōp, a fragrant plant allied to puccoon, forget-me-not, and beggar's lice. There are perhaps 100 kinds of heliotrope found mostly in warm countries. The fragrant garden heliotropes have sprung from two species. One is native to India, the other to Peru. The name is from two Greek words meaning "turning to the sun." Turnsole is the English name—sol meaning sun. Heliotrope is a recognized perfume, and is also the name of a color between violet and purple. See PERFUME.

Helium, a colorless, non-inflammable gas whose practical value was demonstrated in 1918, when American chemists discovered a method of producing it in quantity. Helium like nitrogen and argon, has practically no chemical activity. It is twice as heavy as hydrogen, the lightest known substance, and is now used in place of that gas for inflating balloons because it will not take fire. Helium is found in the atmosphere in proportion of 4 volumes of the element to 1,000,000 volumes of air. It is generally obtained from liquid air by distillation, but it can be separated from its compounds by the use of nitrogen or argon. It occurs in some minerals and is thought to be a product of the disintegration of radium.

In the early days of the World War, the belligerents tried hard to find a gas to fill airships which would be light and non-inflammable. The first German Zeppelin brought down in England was ablaze when it fell over London after being struck by the fiery bullet from an airplane gun and the fact that they were filled with the highly inflammable hydrogen gas was the greatest drawback to the success of the Zeppelins. Then the allies turned to helium, which had been discovered among the elements of the earth by Ramsay in 1895, and which was known to be non-inflammable, but was very ex-

pensive to produce. But it was known that the natural gas wells of Texas and Kansas would yield helium, in some localities nearly 2 per cent of the natural gas being helium. Then in great haste large plants were constructed in the United States to recover helium from the gas wells, by means of liquefaction, and thus one of the chemical problems of the war was solved.

"The matter was, however, kept a well-guarded secret," says a contemporary writer. "Even the name was hidden. Photographs of the plants, when taken, were labeled 'argon' factories. The idea was spread that the purpose of the experiments was to produce a new variety of poisonous gas for warfare, or perhaps a special variety of gasoline for use in airplanes. All sorts of camouflage were adopted to prevent the enemy from learning the true purpose of the experiments. So far had the work progressed that at the time the Armistice was signed, in November, 1918, a consignment of 150,000 cubic feet of helium was on the dock at New York, waiting to be sent to France to be used by the allies for their balloons. Plans were on foot for increasing the output of helium enormously, so that it is probable that had the war lasted until the summer of 1919, the allies could have employed helium gas for observation balloons and for dirigibles of the Zeppelin type, with entire immunity from all possibility that they could be shot down with incendiary bullets."

The manufacture of helium gas has continued in the United States since the war, principally for the use of the army and navy in their airship activities. Government geologists have ascertained that the natural gas found in Kansas, Texas, Oklahoma and California carries a sufficient volume of helium to justify commercial recovery. These authorities believe that by installing collecting facilities gas for 100,000 cubic feet of helium could be collected daily.

Hell, in theology and in common speech, the abode of devils and of the souls of the wicked. The word is Anglo-Saxon, and is used in the King James version of the Bible as an equivalent of the Hebrew "Sheol," meaning grave or pit, and of the Greek "Hades" meaning literally "unseen," and used to designate the place of departed spirits. It is evident that these two words, Sheol and Hades, were used originally to name the place of the dead without distinction as to character. Later the idea of the separation of good spirits from evil arose. The Greeks described offenders as suffering in Tartarus, the dungeon of Hades, while the Jews wrote of Paradise as the abode of the righteous and of Gehenna as the place of torment. In the revised version of the New Testament the Hebrew Gehenna is translated by the word "hell," while the Greek Hades is left untranslated.

The belief in hell as a place of punishment after death has existed since the beginning of Christianity, although some of the early Christian Fathers, notably Origen, did not believe that the torments would be eternal. Through the early, the medieval and the modern periods of the Christian era the different opinions concerning hell have caused endless controversy. Probably at no time have such extreme views been so generally held as from the days of John Calvin up to the early part of the nineteenth century. During this period the Christian church taught not only that the punishments of hell would be eternal, but that they were for others besides those who had themselves sinned. The souls of unbaptized babies, and those who did not accept Christ, even though they had never heard of him, were condemned to "everlasting fire." Sermons were preached and printed describing in minute detail the varieties of torture designed for different classes. Jonathan Edwards, preaching in Enfield, wrought his hearers to such frenzy by his power in picturing the tortures of hell that strong men screamed aloud and the preacher was obliged to calm his congregation before he could proceed with his discourse. Many influences have modified the old ideas of hell.

Hell Gate, a rocky channel in the East River at New York, noted for its danger to navigation. The tide pours in at each end and subjects ships to the dangers of being broken up on the jagged rocks. Irving has made Hell Gate, its shoals, whirl-

pools, and brawling breakers famous. The damage to shipping was so great that numerous surveys were made with a view to improving the channel. In 1869 work began in earnest Operations were rendered difficult by the proximity of expensive buildings. Nearly four miles of tunnels were constructed, and thousands of drill holes charged with dynamite. Over twelve acres of reefs were broken up, and all without damage even to a window. The work was pushed forward rapidly. A channel of a depth sufficient to permit the passage of the largest ocean going vessels was secured.
III-23

Hellebore, hel′ē-bōr, a plant of the crowfoot family. There are about eight species native to Europe and western Asia. They are herbs with palmate leaves. The flowers are large, varying in color with the species from white to green, red, purple, and yellow. There are five broad, petal-like sepals. The petals are small and tubular, furnished with claws, somewhat like those of the columbine. The hellebore is related to aconite. Some species are poisonous, others medicinal. The green hellebore has been naturalized along our Atlantic coast. The white hellebore of the pharmacist, sold in the form of a powder to kill insects, is the pulverized root-stock of an entirely different plant.

Hellespont. See DARDANELLES; GOLDEN FLEECE.

Helmet, a metal cap worn by the warrior as a protection. The origin of helmets is lost in antiquity. The heroes of the Trojan War wore helmets with plumes. The earliest known representations of warriors depict them as wearing some sort of a defensive head covering. Oftentimes this was of heavy leather. The Roman gladiator wore a heavy helmet that protected the head completely. The medieval helmet was provided usually with sliding attachments to protect the neck and sides of the head. When the knight in heavy armor fastened on his headpiece and lowered his visor it was impossible to reach his head with thrust of sword or spear. Nothing larger than a slender knife blade could be inserted through the openings left for sight and hearing. The modern European soldier, especially the soldier of Germany, wears a defensive cap, terminating in a metal point, from which the blow of a sabre will glance off harmless. The fireman's helmet, worn as a protection against water and falling brands, may be regarded as a modification of this ancient piece of armor. See ARMOR.

Helm′holtz, Hermann Ludwig Ferdinand von (1821-1894), a most distinguished physiologist and physicist. He was born at Potsdam, educated as a surgeon at Berlin, remaining in the army in that capacity till 1847, when he published his startling paper on the *Conservation of Energy.* For the next thirty years he occupied successively professorships in physiology, anatomy, or pathology at the Berlin Academy of Art, and the Universities of Königsberg, Bonn and Heidelberg. While at Heidelberg he published those exhaustive treatises, *Sensations of Tone* and *Physiological Optics,* which, with his earlier paper, led to his becoming identified from that time on with physics rather than with physiology. For the next fifteen years he held the chair of physics at Berlin, which became the headquarters for experimental physics for the world. In 1887 he was most fittingly made the director of the national laboratory for physical research at Charlottenburg, the "Reichsanstalt," which position he retained till his death. Several volumes of his scientific lectures are very popular. His work in hydrodynamics and geometry entitles him to rank also as a mathematician, while his breadth of vision and insight would give him standing as a philosopher. While hesitating to say he was the greatest scientist of the century, one can certainly affirm that he had no superior in the realm of physical science.

Heloise, or Eloise. See ABELARD.

Helots, hē′lots, a class of peasant serfs among the ancient Spartans. They were owned by the state and were bound to the soil. They were alloted to the various citizens and performed the work of slaves. Ordinarily they were allowed a certain share of the produce of the fields they cultivated. In war they served as light armed troops. They were doubtless the survivors of an aboriginal people conquered by the Doric invaders. There are tales of cruel and of horrible atrocities, such as wholesale massacre, to keep down their numbers

Helsingfors, the capital and metropolis of Finland, is on the Baltic Sea at the southern extremity of the country. Population, 1921, 188,992. See FINLAND.

Helvetti, hel-vē′shi-ī, the ancient Celtic inhabitants of Switzerland. Students of *Caesar's Commentaries* are familiar with his account of the Helvetians, who attempted to leave their home at Lake Geneva to occupy more fertile parts of adjacent Gaul (France). Caesar met them west of Geneva (58 B. C.), punished them severely and sent them home again. Twenty years later they were practically exterminated by the Romans. Helvetia is still the classical name of Switzerland.

Hematite. See IRON.

Hemans, hĕm′anz, **Mrs. Felicia D. Browne** (1794-1835), an English poet. She was born near Liverpool. She began to write poetry when only nine years old. Her first volume was *Early Blossoms,* published in 1808. The criticisms these poems received were, naturally enough, very painful to the fourteen year old poet. A few years later *The Domestic Affections* was more successful. Miss Browne married a Captain Hemans in 1812. After some years of married life Captain Hemans departed on a journey to the continent. It is believed that a separation had been agreed upon, for the couple never met again. Mrs. Hemans was left with five little children to care for. She continued her literary work until her death. Among her best known works are *The Vespers of Palermo: a Tragedy, The Restoration of the Works of Art to Italy, The Skeptic, Lays of Many Lands.* The poem best known to Americans is *The Landing of the Pilgrims,* beginning,

The breaking waves dashed high
  On a stern and rock-bound coast,
And the woods against a stormy sky
  Their giant branches tossed.

And the heavy night hung dark
  The hills and waters o'er,
When a band of exiles moored their bark
  On the wild New England shore.

It is said that Mrs. Hemans burst into tears when told by an American friend that her "rock-bound coast" was in reality a low sandy shore.

Parting from Mrs. Hemans and her boys on one occasion at Abbotsford, where they had been received as honored guests, Sir Walter Scott said to this gifted woman: "There are some whom we meet, and should like ever after to claim as kith and kin; and you are one of these."

But, calmly sitting in judgment on her work, the "Wizard of the North" was not so complimentary as he had been when speaking of her personality, for he said that her verses were "too poetical," in that they contained "too many flowers and too little fruit." This is the verdict of posterity.

Hemlock, a name of varied application. The hemlock of Europe and of history, the hemlock the juice of which Socrates in prison drank from the hand of his executioner, is a parsnip-like herb that we call poison hemlock. The hemlock of American lumbermen is a spruce, a fine evergreen tree, valued for its timber. See SPRUCE.

Hemp, an annual herb, with a tough, fibrous bark, belonging to the nettle family. Native to central Asia. As cultivated, or growing in waste places, hemp is from four to fourteen feet high. The pollen-bearing flowers and the seed-bearing flowers are on separate plants. The dark green leaves are composed of from five to nine lanceolate, serrate, pointed leaflets, two to five inches long and about one-sixth as wide. Hemp is cultivated for seed and fiber. Seed hemp is raised in hills like corn, and produces immense plants with stalks like a sunflower and a wide head of branches. The seed commands a good price as bird seed and for sowing. The chief crop is sowed broadcast, for fiber. Hemp for seed is sowed in drills.

The strong, limestone land of Kentucky raises about 10,000,000 pounds of hemp fiber a year, which is not far from two-thirds of the entire American crop. A typical plant in a dense hemp field is ten or twelve feet high. The black land of Russia produces hemp twenty feet high. The stem is from a fourth to three-eighths of an inch in diameter. The inner bark is the hemp of commerce. The Kentucky farmer finds it advisable to follow a five year rotation of hemp, corn, wheat, two crops of clover which is sowed with the wheat, then hemp again. Plowing and sowing are practically the same as for oats or spring wheat. One to three bushels of seed are required per acre. The young hemp plants are expected

to overshadow and keep down weeds. Hemp is cut when the pollen is falling (July in California, September in Kentucky), either by hand, with a heavy sickle, or with a strong self-rake reaper or even a mower. It is left on the stubble to dry. It should be turned over frequently. When dry it is placed in shocks or in a carefully built rick. The next operation is retting, a word related, no doubt, to rotting. In France and Italy, it is placed in tanks of water; but in Kentucky the hemp is spread out in long rows on blue grass sward to ret or decay in the dew. Bacteria get at work and decompose the gum that forms a part of the bark, and loosen it also from the woody stem, so that the fibers of hemp hang loose practically the whole length of the plant.

The next process is breaking or pounding the plants, armful by armful, until the woody part of the stem drops out, leaving the rough hemp ready for market. Machines are in use for this work, but they have not yet been perfected sufficiently to take the place of hand labor. A man breaks from 100 to 250 pounds a day. The rough fiber is put up in bales of 150 pounds each and sold to local buyers (in Kentucky) at from $60 to $100 per ton. Portable breaking machines will soon be able, it is thought, to do the work, and thus reduce the cost of raising hemp. Local dealers hackle the hemp, that is, draw it across clusters of upright sharp spikes that comb out the remnants of the inside stem and straighten the fiber. The fine, clean fiber is doubled up and knotted or tied into small bundles of three or four pounds. It is then the hemp of commerce. The rougher fiber, which is hackled out, is called tow. It has a soiled whitish color, whence the name tow-headed as applied to a child.

China and Japan, France, Russia, and Hungary raise large quantities of hemp. The processes are essentially the same in all countries, and have not changed materially for a thousand years; but experiments are on foot to break with machinery, and to loosen the fiber in a chemical bath, thus cutting out the slow and uncertain process of rotting by dew.

Hemp is an excellent material for cordage. To say that one will "stretch hemp" is a slang phrase implying that he will be hanged. Hemp ropes have great strength, and were long preferred to all others on shipboard. During the early days of the American navy, Lexington, Kentucky, was headquarters for naval rigging; but, with the invention of wire ropes, the hemp industry fell off. Now that wireless telegraphy requires a mast head free from the presence of iron, the demand for hemp ropes seems likely to revive. At present the Kentucky product is used chiefly in the manufacture of twines, and of chain for the back of Axminster, Brussels, and Moquette carpets.

See HASHISH; FLAX; KENTUCKY; MANILA; SISAL.

Hen. See CHICKEN.

Hen-Hawk. See HAWK.

Henbane, a plant of the nightshade family. It is related also to tobacco and the stramonium or jimson weed. It is a poisonous plant. It proves deadly when eaten by poultry, whence the name. It is a coarse, upright, clammy herb, with hairy foliage and a disagreeable odor. It has pale yellowish flowers streaked with purple veins. The leaves are used for medicinal purposes, resembling belladonna in their effect. Overdoses are fatal to man, but swine appear to eat it without injury. One of its common names is hog's bean. Henbane is a native of Europe and northern Asia. It has become established in the eastern part of the United States.

Henderson, Peter (1822-1890), a gardener, florist, seedsman, and writer. He was born near Edinburgh, Scotland, and died at Jersey City. Henderson learned market gardening in Scotland and came to this country in 1843 with the savings of three years of manual labor. He began raising vegetables for the New York City market. In 1865 he opened up a seed business which is still conducted by his sons. His fame rests on numerous books for the market gardener and amateur. Henderson was a natural manager of details as well as of affairs on a large scale, and his books told how. *Gardening for Profit* appeared in 1865. A friend states that he wrote it in bed in an aggregate of 100 hours wedged

in before going to sleep at the close of a day's work of sixteen hours, largely of manual labor. One hundred and fifty thousand copies of this practical book were sold. *Practical Floriculture, Gardening for Pleasure, The Handbook of Plants, Garden and Farm Topics, How the Farm Pays,* followed in due succession. Although it is estimated that Mr. Henderson wrote 100,000 letters with his own hand he was never too busy to answer inquiry as to how to cultivate vegetables or flowers. Peter Henderson is an example of the simple, hard-headed, shrewd, kindly, industrious, able, unsefish, successful man of money, of whom we cannot have too many.

Henderson, Ky., the county seat of Henderson County, is on the Ohio River, 10 miles below Evansville, Ind. It is connected by boat with all river ports and is served by three railroads. The river at Henderson is spanned by a fine steel bridge designed by G. W. G. Ferris, designer of the Ferris Wheel. The city is in the center of a beautiful agricultural district, and is an important market for stemmed tobacco. Its manufactures include cotton and woolen goods, flour, hominy, boxes, buggies, agricultural implements, cigars and other tobacco products, furniture, dressed meat and chemicals. There are at present five coal mines adjacent to Henderson with another seam developed.

Henderson has a public library and a complete public school system, including a junior and senior high school. The city owns and operates the water works and the electric light and gas plants. It has three large parks comprising nearly 200 acres. Historically it is noted as having been the home of John James Audobon, naturalist, during a large part of his active life. It possesses two fine up-to-date hospitals. Its churches and Y. M. C. A. are modern. Population in 1920, 12,169.

Hendricks, Thomas Andrews (1819-1885), an American statesman and vice-president of the United States during Cleveland's first administration. He was born at Zanesville, Ohio, as a boy was taken to Shelby County, Indiana, and in 1843 was admitted to the bar at Chambersburg, Pennsylvania. His education was received in the public schools and at South Hanover College, Indiana. In 1850 he was a member of the Indiana State Constitutional Convention and from that time on served, in turn, as member of Congress, Commissioner of the General Land Office, United States Senator, and governor of Indiana. He was defeated as Democratic candidate for vice-president in 1876, but was elected to that office on the ticket headed by Cleveland in 1884.

Hengist, or **Hengest,** and **Horsa,** are supposed to have been two brothers, leaders of the Jutes in the fifth century, summoned by the king of the Britons to drive back the Picts and Scots. The Jutes overcame the invaders, then turning against Vortigern, the British king, became themselves invaders and conquered, it is said, all of Kent. Hengist thus led the first successful Teutonic invasion of Britain. He is thought to have died in 488 A. D. See JUTES; PICTS.

Hennepin, Louis, the discoverer of St. Anthony Falls. He was of French ancestry, but was born in Belgium about 1640. He was educated as a Franciscan monk. He served in the French army as a chaplain. He accompanied La Salle in 1675 to Canada. He acquainted himself with the language of the Indians, and engaged in preaching to them. He took trips through the Mohawk country, and in 1679 he joined La Salle's expedition of discovery. The company sailed through Lakes Erie, Huron, and Michigan to the mouth of St. Joseph River. Here they left the ship, the Griffin, and went up the St. Joseph in canoes. These they carried over a portage to the Kankakee, down which they floated to the Illinois. They built a fort where Peoria now stands. Hennepin and two companions set out on a vogage toward the northwest, under orders to rejoin La Salle at the mouth of the Wisconsin River. They followed the Illinois River to its mouth, then went northward up the Mississippi, until they were captured by a band of Sioux and conducted to the villages of the latter on Mille Lacs, Minnesota. During this captivity Father Hennepin saw and named the Falls of St. Anthony in the Mississippi. This occurred April 30, 1680. He was rescued by a French voyageur, and, on his return to

France, published a *Description of Louisiana.* Hennepin's name was given to the county of Minnesota which surrounds the Falls of St. Anthony; also to a main avenue of Minneapolis leading from the Falls westward.

Henry, Alexander (1739-1824), a fur trader born at New Brunswick, New Jersey, spent almost all of his life in Canada and was one of the pioneers who opened a way westward through Canada to the Rocky Mountains. He served with General Amherst during the British invasion of Canada in 1760, but later went to Mackinac and engaged in fur trading. When the garrison at Mackinac was massacred by the Indians under Pontiac, Henry was one of the few who escaped death; but the Ojibways held him captive for a year after the uprising. He resumed his trading, often making journeys as far west as the Rockies and bringing back reports of the country that lay between the range and Montreal. Henry tried to form a company to develop the copper resources on Lake Superior, but was unsuccessful. He is now best known as the author of *Travels and Adventures in Canada and the Indian Territory Between the Years* 1660 *and* 1776.

Henry I (1068-1135), king of England. He was the youngest son of William the Conqueror, and came to the throne in 1100. He restrained Normandy from breaking away from England; restored many wholesome laws in England that had been suspended; gave England its first charter; suppressed some of the powerful nobles who opposed the crown; and has the credit of bringing the Norman and English elements of his population more closely together. He was called the Lion of Justice, and Beauclerc, or the fine scholar.

Henry II (1133-1189), king of England. He was the first of the long line of Plantagenet kings, coming to the throne in 1154. His mother was English, his father was a French count. He held more than half of France. In fact, he regarded himself as a French monarch with English possessions across the channel. For all that, he is considered one of the best rulers England has had. He adopted the far-reaching measure of substituting royal courts of justice for local ones. Judges traveled throughout his dominions, holding court, with the beginnings of a jury system. It has been possible ever since Henry's day, therefore, for plaintiffs to seek justice before a court less likely to be influenced by local prejudices; in other words, to escape local tyranny. The Irish owe him no love, however, for in his reign English rule was extended over that island. The reign of Henry is made memorable by his contest with Thomas à Becket. See BECKET.

Henry III (1207-1272), king of England. He succeeded his father, King John, in 1216. His reign is characterized by weakness and tyranny. Because of his misgovernment, the nobles under the leadership of Simon de Montfort, Earl of Leicester, rose in revolt. The king was defeated and taken prisoner, and De Montfort became the actual head of the state. To gain popular support he summoned a Parliament in 1265, which is conspicuous in history because it was the first time that representatives of the common people had ever met with the lords. The following year De Montfort was slain, and soon afterward Henry was restored to the throne.

Henry VI (1421-1471), king of England. He was the last Lancastrian king of England and his reign is notable for the close of the Hundred Years' War with France, which left England only Calais; for Cade's rebellion, expressive of social and political discontent; and for the beginning of the Wars of the Roses, the factional struggle which contributed largely to the destruction of feudalism in England. See WARS OF THE ROSES.

Henry VII (1456-1509), king of England. He was the first of the house of Tudor. He ruled 1485-1509. By marriage, he united the houses of Lancaster and York, bringing the Wars of the Roses to a close. His reign covers a period of activity in exploration. The voyages of the Cabots laid the foundation for English territorial claims in the New World. Henry strengthened the government, restored the courts, and put down uprisings against himself. He created the court of

the Star Chamber. His private fortune, it is said, amounted to $10,000,000, most of which was amassed by injustice and extortion. See STAR CHAMBER.

Henry VIII (1491-1547), king of England. He succeeded his father Henry VII in 1509. His reign is noted because of the separation of the English church from Rome in 1534, and the subsequent destruction of the monasteries, the great wealth thus obtained being used to create a new nobility dependent on the king. During his reign Parliament reached its lowest point of subserviency, and it was also a period of great economic distress. Henry is notorious for his numerous marriages, but of his six wives, only three are deserving of mention: Catherine of Aragon, the mother of Mary Tudor, whose divorce brought about the separation from Rome; Anne Boleyn, the mother of Elizabeth; and Jane Seymour, the mother of the future Edward VI. See WOLSEY; CRANMER; CATHERINE OF ARAGON; REFORMATION.

Henry IV (1553-1610), king of France. He ascended the throne in 1589. He is known in history as Henry of Navarre. He became the head of the Huguenot party on the death of the Prince de Condé in 1569. He married Margaret of Valois, sister of Charles IX of France, in 1572. Subsequent to the massacre of St. Bartholomew, he put an end to the civil wars of France by embracing the Roman Catholic religion. In this way he secured the adherence of the Roman Catholics, and was crowned by the united nation at Chartres in 1594. To secure his old followers, he published the Edict of Nantes April 15, 1598. He was assassinated by a fanatic named Ravaillac. See CATHARINE DE MEDICI; BARTHOLOMEW; NANTES; HUGUENOTS.

Henry IV (1050-1106), emperor of the Holy Roman Empire and king of Germany. The principal event of his reign was a struggle with Hildebrand, known in papal history as Gregory VII. Henry was obliged finally to yield to the pope. See CANOSSA; GREGORY VII.

Henry, Joseph (1797-1878), the first secretary of the Smithsonian Institution. He was a native of Albany, New York. He took up the study of medicine, but abandoned it for engineering. In 1826 he became an instructor in Albany Academy. He was much interested in electro-magnets, a subject on which he delivered public lectures. By means of an electric battery, a coil of wire, and a soft iron core, he made a magnet capable of sustaining a weight of 3,500 pounds, to the great astonishment of the scientific world. His experiments led to the construction of the magnetic telegraph. His reputation won him the chair of natural philosophy in Princeton College. In 1846 he was made secretary of the Smithsonian. He had the privilege of organizing that institution. He won still further fame as the organizer of systematic information leading up to the establishment of the United States Weather Bureau. See SMITHSONIAN INSTITUTION.

Henry, Patrick (1736-1799), a patriot lawyer of Virginia. He was educated in a country school and in a school kept by his father. He tried merchandising and farming, but lost money at both. He then turned his mind to the study of law, and was admitted to practice in 1760. Three years later he won reputation by the management of a famous law case, known as the Parson's Cause. At that day the clergymen of Virginia, like those of England, were entitled to salaries from public funds. Their salaries were reckoned in part, at least, in the currency of the day, namely tobacco. In 1758 the Virginian House of Burgesses passed an act granting the planters permission to discharge their obligations to the ministers by a cash payment of two pence for each pound of tobacco raised. The income of the clergy was diminished. The clergymen carried the matter to the king, with the result that the two pence act was repealed. The people were stirred up, because the king had overturned an act of their own legislation. The parsons brought suit to collect arrears, the share of tobacco being worth more than the two pence per pound. Henry defended the planters and won the case, the clergymen being allowed but a penny each in full of all claims. At the conclusion of the suit the crowd caught up Henry and carried him on their shoulders to the tavern. From this time on he

was the idol of the people. Public office was his for the taking.

In 1765, at the time of the passage of the Stamp Act, he was a member of the House of Burgesses. He offered a set of resolutions declaring the exclusive right of colonists as Englishmen to tax themselves. These resolutions, says Bancroft, "rang the alarm bell for the continent." In 1775 he stirred up the people of Virginia, much as Sam Adams stirred up the citizens of Boston. He attended the second Virginia Convention, and offered a resolution that the colony be put immediately in a state of defense. He made an eloquent plea for instant action, closing, it is said, with these words (according to a friend's report, written from memory, many years later):

> Gentlemen may cry "Peace! Peace!" but there is no peace. The war is actually begun! The next gale that sweeps from the north will bring to our ears the clash of resounding arms. Our brethren are already in the field! Why stand we here idle? What is it that gentlemen wish? What would they have? Is life so dear, or peace so sweet as to be purchased at the price of chains and slavery? Forbid it, Almighty God! I know not what course others may take, but, as for me, give me liberty, or give me death!

Henry was a member of the first Continental Congress. He acted as governor of Virginia during the war. He was dissatisfied with the federal constitution and opposed its ratification in 1788. He felt that it gave the general government too much power, a position taken by his state later at the opening of the Civil War.

Henry the Navigator (1394 - 1460), fifth son of King John of Portugal, was born at Oporto. To Prince Henry, whose ambition was the discovery of unknown parts of the world, is due much credit for establishing navigation on a really scientific basis. He encouraged the Portugese sailors whenever an exploring expedition was proposed, and it was through his inspiration that the shape of the African coast was discovered. At Sagres, Prince Henry founded a school of navigation. The Maderia Islands were reached by the Portugese in 1420, and the Azores in 1448. Brazil was reached and Africa circumnavigated, and Portugese empires were built in India and South America. The impulse that Prince Henry imparted to navigation resulted in 50 years of steadily increasing wealth of possession for the people of his land.

Henschel, Sir George (1850-), a noted German-English baritone singer, composer, and one time conductor of the Boston Symphony Orchestra. He was born in Breslau, Germany, and educated there, in Leipzic, and in Berlin. After singing with great success in Brussels and Cologne in 1873-74 he removed to London in 1877, winning even greater applause there. Sir George was conductor of the Boston Symphony Orchestra during 1881-84. In 1885 he returned to London. During 1886-88 he was professor of singing at the Royal College of Music, London, succeeding Jenny Lind. He founded, and for eleven years conducted, the London Symphony Concerts. Sir George has composed songs; vocal studies; *a Requiem Mass*; the comic opera, *A Sea Change*; the serious opera, *Nubis*; and *Te Deum*.

Henty, George Alfred (1832 - 1902), an English war correspondent and author of many very popular boys' books, was born at Trumpington, Cambridgeshire, and educated at Westminister School and at Cambridge. Mr. Henty served in the British army for a time, and in 1866 became war correspondent for the London *Standard*. In the service of this paper he was in the field during the Austro-Italian, Turco-Servian and Franco-Prussian wars, as well as during the African expeditions of 1868 and 1873. Mr. Henty's first novel appeared in 1866, and he wrote fiction from then until his death. His stories are clean, wholesome and thrilling; they are mostly of a historical character, and as such are always accurate; the heroes are frequently boys. It is these features, and not literary merit, that explains the popularity of Henty's tales. Some of the better known are *In the Irish Brigade, Out With Garibaldi, With Roberts to Pretoria, At the Point of the Bayonet, Malcolm the Water Boy, The Treasure of the Incas* and *With the British Legion.*

Hepatica, a lowly, modest plant of the buttercup family, closely allied to the anem-

one. In northeastern United States the hepatica is the earliest flower to bloom in the woodlands. Its flowers vary from white and pink to purple. The leaf is three-lobed. While the snow still lies deep in the sugar camp hepaticas may be found on the brow of a ravine exposed to the southern sun. A few days later others may be found snuggled up to the south side of a huge stump. Hepaticas do well in a shady, rich corner of a garden, if they can have plenty of loam from the woods.

Hephaestus, hĕ-fĕs′tŭs, in Greek mythology, the god of fire and of all artists who worked in iron and metals. He is identified with the Roman Vulcan. See VULCAN.

Hepplewhite, George (?-1876), a famous English furniture maker of the 17th century. Little known of his early life, except that he served as apprentice in the Lancaster shop of the Gillows. The furniture that he turned out was severely simple, and was a development of the graceful and delicate classic type. The Hepplewhite chairs are small and graceful; backs shield or heart shape, supported by side posts, while the legs are slender, plain or fluted, often ending in a spade foot; the ornaments are inlaid or painted.

Hera, hē′ra, in Greek mythology, a daughter of Cronus and Rhea, and the sister and wife of Zeus. She corresponds to the Roman Juno. The name Hera means the "chosen one." She was the type of a faithful wife and mother, and was treated with reverence by the other gods, Zeus himself respecting her counsels, although she must obey him unquestioningly. She was jealous, but with excellent reason, for her husband was often faithless. The disposition ascribed to Hera by Greek writers is much that of a modern termagant. When she became too obstinate and quarrelsome Zeus punished her. Once he hung her up in the clouds with her hands bound and anvils tied to her feet. Later writers give Hera the character of queen of heaven, second in power to Zeus only. Hera aided the Greeks in the Trojan war, because Paris, son of King Priam of Troy, gave the golden apple inscribed "for the fairest," not to her, but to her beautiful rival Aphrodite. In art, Hera is represented as a majestic woman, wearing a diadem and clad in flowing drapery. In her right hand she holds a sceptre. The Graces and the Hours were her handmaids, and Iris, the rainbow, was her messenger.

Heraldry, the art and science of genealogy and of armorial bearings. In military affairs, the herald was an officer sent as a messenger by a sovereign or a general to one in equal authority—a sort of military ambassador. The costume of a herald was emblazoned with the armorial bearings of his master. None other might wear it. He was expected to conduct himself with dignity as befitted the representative of a sovereign. Whatever his message he must be allowed to depart in peace. In the medieval ages the herald was a man of character, an authority on all such questions as genealogy, rank, official precedence, courts of arms, emblems, flags, etc.

The science of heraldry included the badges and emblems on shields, helmets, and banners. In England, as early as 1483, the science of heraldry was committed to the Herald's College, or College of Arms, at London. In Scotland the corresponding institution was the Lyon Court. None might display a family crest, device, or figure without permission from the authorities. The marking of the kite-shaped escutcheon or shield with armorial bearings was a matter of gravest concern. The materials were gold or silver. Five colors were in use,—red, blue, black, green, and purple. They were known in heraldry as gules, azure, sable, vert, and purpure. Each had its special significance. The various combinations of lines and points are too numerous to mention, and too intricate for the understanding of other than a specialist.

"The knights in the early days of heraldry ransacked the animal, the vegetable, and mineral kingdom, as well as the range of things natural and artificial, for cognizance which would be distinctive and at the same time suggestive of the name and title of the bearer of them." The lion, leopard, bear, boar, bull, and stag in various positions were employed. Of birds, the eagle, the martin, the pelican, the swan, the falcon, the raven, the parrot, and the peacock were adopted. The scallop shell was sig-

nificant of a pilgrim. The dolphin, the griffin, dragon, unicorn, basilisk, and even the harpy, appeared in coats of arms. Prominent in badges were the sun, moon, and stars. Even prosaic objects, such as helmets, buckles, horseshoes, swords, arrows, staves, spurs, water bags, and trumpets were employed as devices. The rose, trefoil, various leaves, sheaves of corn, trees torn up by the root, and especially the fleur-de-lis, were adopted as family emblems.

If the distinction between *ermine* and *vair, bend* and *bend sinister, St. Andrew's cross* and *cross maltese, sejant* and *couchant* seem trivial, it may be said in reply that, while such matters belong peculiarly to people of leisure, they are quite as intellectual and much more artistic than the advertising devices on which the present day civilization spends so much time and money.

See TABARD.

Herat, a city of Afghanistan, situated near the Herirood river, 360 miles west by north of Kabul. It is well fortified and is surrounded by a bastioned wall. It contains a number of caravanseries, public baths, and mosques. It is a commercial center for the products of India, China, Hindustan and Persia.

Its industries include the manufacture of carpets, leather, caps, wearing apparel and shoes. Its position makes it commercially important, for through it run and near converge it all the great roads that lead to India. Population, 20,000.
mind and body. See AUGEAN STABLES; GERYON; HESPERIDES.

Herb, erb, a plant that dies to the ground each season. Herbs are annuals, biennials, or perennials. Annuals die root and branch on the approach of winter. Corn, wheat, cucumbers, tomatoes, pigweed, foxtail, peas, and beans are annuals. Carrots, onions, cabbage, and mullein, if planted from the seed, grow a root or bulb or root-stock one season, die down to the ground, and produce seed the second season. They are biennials. In their native countries the roots live over winter in the ground. Perennial herbs make underground arrangements each season for spring growth, and die down to the ground. Timothy, Kentucky blue grass, strawberries, hollyhocks, tansy, nearly all wild sunflowers, asters, goldenrod, and water lilies are perennial herbs. Theoretically the clump of a perennial plant will grow year after year in the same spot to the end of time.

Herbarium, her-bā′rĭ-ŭm, a collection of dried plants preserved for purposes of study. An older Latin name is the *hortus siccus,* or dry garden. If a plant be not too large it may be preserved, root and all. The botanist desires two specimens of each flowering plant, one in bloom, the other in fruit. Small plants are pressed entire. Characteristic portions of larger plants are selected. The collector places his specimens between thin sheets for convenience in handling. They are then dried under pressure between sheets of blotting or other bibulous paper. The blotters should be changed and dried at least daily in order to preserve the natural colors of the plant. When dry, the specimens are mounted on heavy paper of uniform size, usually eleven and one-half by seventeen and one-half inches. Each specimen is accompanied by a label giving the botanical name, the date and locality of collection, with such other information as to soil and altitude as may be of interest. Such specimens, laid away in jackets and preserved in cabinets, last for centuries. Specimens put away by Linnaeus, Hooker, and Gray are still in excellent condition, and are regarded by botanists as priceless. The British have been the most noted collectors. The most famous herbarium in the world is perhaps that of Kew near London. The British Museum and the London Linnaean society, the Universities of Paris, Leyden, Berlin, and Vienna have very valuable herbariums. The most valuable collection in the United States is probably the Gray Herbarium of Harvard University. Next to that comes the United States National Herbarium at Washington. The University of California, the Shaw Botanical Garden, and the New York Botanical Garden possess many specimens from which new species were named. See BOTANICAL GARDEN; GRAY; LINNAEUS.

Herbart, Johann Friedrich (1776-1841), a distinguished German psycholo-

gist. He was a student of Fichte at Jena and became a professor in the universities of Königsberg and Göttingen. His psychological lectures and writings are celebrated for their application to educational questions. Students of his theory are known as Herbartians. Among other doctrines emphasized by him that now seem but common sense is that of interest, namely, that a child can learn to best advantage when interested in a subject.

Herbert, George (1593-1632), an English clergyman and poet. He was born at Montgomery Castle, Wales. He was of noble family and much was expected of him. He received his education at Cambridge, and after becoming a fellow entered the church. He was given the living at Bemerton, near Salisbury, where he lived a zealous and faithful pastor until his death. He was a modest man of great decision of character and of a courteous and gentle manner which won him many friends. When on his deathbed he asked a friend to examine his poems and to burn them, unless he thought they might be of advantage to "any poor, dejected soul." The poems were published under the title of *The Temple*. They are short, simple, earnest, religious poems. Herbert was also the author of several prose works.

Herbert, Victor (1859——), a musician and composer of light operas whose works have given him an international reputation. He was born in Dublin, Ireland, and educated in music in Germany. After touring Europe as a 'celist, he came to New York in 1886 as 'celist of the New York Metropolitan Orchestra. He succeeded Gilmore as leader of the Twenty-second Regiment band and later was conductor of the Pittsburgh Symphony Orchestra. Since 1904 Mr. Herbert has devoted his time to composing. Among more than twenty-five light operas *Babes in Toyland, Princess Pat* and *The Singing Girl* are especially popular. *Natoma* is a grand opera based on American history and requiring American scenery.

Herculaneum, her-ku-la-ne-um, an ancient Roman city. It was situated six miles southeast of Naples at the foot of Mount Vesuvius. In the days of its prosperity it was a fortified city of wealth and influence. In 63 A. D. it suffered from an earthquake shock. In the terrific eruption of 79 A. D. cinders and lava covered it to a depth of from 75 to 120 feet. In an hour, one might say, the city disappeared from view. Though excellent descriptions remained the volcanic outflow covered so extensive a territory that no one knew just where to look for Herculaneum. The city lay undisturbed for seventeen centuries. Modern villages and vineyards were above it. In 1709 a villager sinking his well brought to light sculptures and marble facings. In 1738 the well was dug deeper, when it was discovered that it had penetrated the ancient theater. Though little was done immediately, public interest was aroused. Victor Emmanuel caused extensive excavations to be made with astonishing results. The accounts of the former magnificence of the city have been fully sustained. The theater mentioned was found to be a magnificent edifice of solid marble, with eighteen rows of seats, capable of seating 8,000 people. The galleries were run into the ancient streets, and doors that had been closed for eighteen centuries were reopened. Coins, jewelry, statues, paintings, libraries of old papyrus, beautiful mosaics, articles of furniture, vases, glass, and terra cotta ware were brought out in a wonderfully perfect state of preservation and deposited in the neighboring museum of Naples. A number of noted statues were recovered, as well as busts of Plato, Demosthenes, Seneca, Augustus, and Scipio Africanus. Among the villas of wealthy owners was one in which a provision room contained dried figs, almonds, dates, chestnuts, walnuts, prunes, corn, olive oil, peas, hams, and even pies, that had been sealed up here under volcanic ash for nearly 1,800 years. See VOLCANO; VESUVIUS.

Hercules, hir'kū-lēz, one of the heroes of classical mythology. He was the son of the divine Zeus and mortal Alcmene. Hera, wife of Zeus, was, of course, offended, and declared war against Hercules from his birth. She sent two serpents to destroy him in his cradle, but the child strangled them with his hands. Hera, however, contrived to render Hercules subject to his cousin Eurystheus whose commands he was required to execute. This cousin

assigned him what are known as the twelve labors of Hercules. They were:

1. The strangling of the Nemean lion.
2. The killing of the Lernean hydra, a nine-headed serpent.
3. The capture of the Arcadian stag, with golden horns and brazen feet.
4. The capture of the Erymanthian boar, by chasing it in the deep snow until it was tired.
5. The cleaning of the Augean stables, where 3,000 oxen had been kept for 30 years. He turned on the water of two rivers and swept the stables clean.
6. The slaughter of the Stymphalian birds. They fed on human flesh. These he shot with his bow and arrows.
7. The capture of the Cretan bull.
8. The capture of the man-eating mares of Diomedes.
9. The securing of the girdle of Hippolyte, queen of the Amazons.
10. The fetching of the red oxen of Geryon.
11. The procuring of the golden apples of the Hesperides.
12. The bringing to the upper world of Cerberus, the watch-dog of Hades.

Finally, after performing his wondrous deeds, Hercules married Dejanira and settled down in peace. After several years Dejanira became jealous. She sent Hercules a garment saturated with poison, believing it to be a love charm. Hercules suffered intense agony from the poison. The wife in her remorse committed suicide. Hercules in grief caused a funeral pile to be placed in Mt. Oeta. He lay down with his head resting on his club and drew his lion's skin over him. He gave his bow and arrow to a friend, Philoctetes, and asked him to apply the funeral torch. The flames spread. Hercules maintained an unchanging countenance. When the mortal half inherited from his mother had been burned, Zeus enveloped him in a cloud and took him to heaven in a chariot. Hera, now reconciled, received him into her family, and gave him her daughter Hebe in marriage.

Hercules is the most celebrated hero of the early Greek legends. He appears in all the most important myths of the time preceding the Trojan War. He is the Greek ideal of human perfection, not physical perfection alone—but that perfection which combines the highest qualities of mind and body. One story relates that in his youth the two goddesses, Virtue and Pleasure, appeared to him where two roads met and each besought his favor. At the time Hercules was suffering from the oppression of his master Eurystheus, and was very unhappy. He longed to follow Pleasure, but chose Virtue, and remained faithful to her counsels. Many temples were built to the honor of Hercules and he was worshipped as a god. He was a favorite subject for artist and sculptor.

See AUGEAN STABLES; GERYON; HESPERIDES.

Hercules, Pillars of a name given to the two rocks that form the entrance to the Mediterranean at the Strait of Gibraltar. The Greeks thought they were erected by Hercules. The pillars are not mentioned by Homer, though he speaks of Ulysses' passage out of the Mediterranean and back into it, which shows he had a knowledge of the strait. The first author to mention them is Pindar, who places them at Gades (Cadiz). The most general opinion, however, identifies them with Calpe (now Gibraltar.)

Herder, Johann Gottfried (1744-1803), a German poet, critic, and thinker. He was the son of a poor schoolmaster. He worked his way through the University of Königsberg. He held various positions as a tutor, teacher, and pastor. Through the influence of Goethe he was invited to accept a position as court preacher at Weimar. He was a man of profound thought and intense patriotism,—one who had a wondrous quickening influence on those whom he met. His masterpiece is considered *Ideas on the Philosophy of the History of Mankind.* The Stuttgart edition of his complete works runs into sixty volumes. His is one of the great names in the history of German thought, not so much for felicity of expression, for his writing is faulty and awkward, as for his influence on younger men.

Heredity, the transmission from one generation to another of physical, mental or temperamental characteristics. Heredity has been defined by at least one authority as a kind of memory in the cells, by which parents transmit to their offspring similar organs and functions, so that one species produces its kind and also the traits of the family and individual.

Of well-recognized commercial value to the stock-raiser and plant breeder, heredity as a factor in the evolution of the human race has received comparatively little attention. Since Darwin's time, however, anthropologists have been at work endeavoring to establish laws in this field of inquiry. The method of studying heredity in man is not by the study of man alone but, as in the case of physiology and anatomy, by the study of heredity in other animals and in plants, also by comparison of the phenomena observed in the various classes. In this way an enormous mass of observations has been accumulated from which two conclusions have been drawn, which are sufficiently demonstrated to merit the designation of "laws." These are "Galton's law of ancestral inheritance," and "Mendel's law." The latter will be found treated in a special article under that head. Galton's law is that, on an average, one-half of the heritage an individual possesses comes from his parents, one-fourth from his grandparents, one-eighth from his great grandparents, and the remainder from more remote ancestors. While the scientists have labored for years to establish these laws, many people have made of heredity what Burbank calls a "dark specter—merciless and unchangeable, the embodiment of fate itself." There seems to be a prevalent idea that traits of character, especially bad traits, or those which cause the possessor misery of any sort, must have been directly inherited, and that there is, therefore, no help for them. To be convinced that there can be no foundation for such a belief, to get a clear view of the relative importance of the two great forces, heredity and environment, and of their meaning to us as individuals, one should read Luther Burbank's *The Training of the Human Plant,* dedicated to the sixteen million public school children of America and to the untold millions under other skies, a little book which might be well placed in the hands of every young man and woman. He says that "heredity is simply the sum of all of the effects of the environments of all past generations on the responsive, ever-moving life forces."

Much has been written of the inheritance of criminal instincts. Mr. Burbank tells us that if the child of criminals be placed in a "setting of morality, integrity, and love, the chances are that he will grow not into a criminal, but into an upright man." It has been proven that acquired traits and habits are not transmitted directly from father to child. The father who has acquired the alcohol habit, for instance, does not transmit the taste for liquor to his children. Such a taste to be inherited must have become "fixed" by long continued repetition, that is by many generations, in most of which the habit has been acquired.

So also an acquired disease, or insanity, resulting from accidental cause is not hereditary. If the parent's general health becomes enfeebled his offspring may lack vigor but that a specifically acquired disease will be transmitted directly, is as little to be expected as that the child of a man who has lost a leg will be born one legged.

We must conclude, therefore, that as far as race culture is concerned, heredity is of equal importance with environment, and is entitled to thoughtful consideration; but for the individual to make either an excuse or a bugbear of heredity is folly.

See EUGENICS; MENDEL'S LAW.

Heretic. See GOD.

Heriot. See EDINBURGH.

Hermann, a German chieftain. The liberator of Germany from Roman dominion. He lived about 18 B. C.-21 A. D. He entered the Roman army to learn the military art and was made a Roman citizen with the name of Arminius. Returning to his people, he organized a revolt. In the year 9 A. D. he fell upon the Roman Varus in the Teutoburg Forest and defeated him with great slaughter. He succeeded in keeping the Romans on the west side of the Rhine. In 1846 the Germans completed a Denkmal or monument on the highest point in the forest near the scene of Hermann's great victory. The base is an arched structure 100 feet in height. A heroic statue of Hermann in bronze stands on this substructure. The figure is 56 feet high, the point of his sword rises 30 feet above the top of the helmet, so that the total height of the monument is 186 feet. An interior gallery com-

mands a magnificent view of the surrounding country. The exact site of the battle is not known. Naturally the name of Hermann is a great one among the Germans. Several monuments have been erected to his honor in the United States. One is at New Ulm, Minnesota.

Hermann and Dorothea, a pastoral poem by the German Goethe, published in 1797. The poem is epical in character, and is sometimes classed as a domestic epic. It contains about 2,000 lines. The scene is laid in Germany, in Goethe's own time.

Hermes, in Greek mythology, the son of Zeus and Maia. There were several of the name in Egypt and elsewhere. Even the accounts of the Grecian Hermes vary. He was a precocious youth. When four hours old he escaped from his cradle, twisted the entrails of a sheep into strips, which he stretched across a tortoise shell for a sounding board, thus inventing the lyre. This he concealed in his cradle. At nightfall, being hungry, he started out to seek food, binding his feet with branches of myrtle and tamarisk to conceal his tracks. He stole fifty oxen from Apollo and drove them backward and forward, so that it could not be told which way they were traveling, and concealed them in a cave. Two he roasted, eating a part, and sacrificing the rest to the gods. Apollo missed his cattle but could not find them. An old man told him that he had seen a boy driving a herd of oxen in a peculiar manner. Satisfied that Hermes was the culprit, Apollo tracked him up Mt. Olympus into the presence of Zeus. Zeus was rather amused at his forward youngster, but ordered him to make restitution. Hermes then showed Apollo his lyre, and succeeded in trading it to the delighted Apollo for a half interest in the oxen. Apollo gave Hermes a goad with which to drive and presented him with a messenger's wand. The latter was a staff of olive wood, encircled by two twining serpents and having a pair of wings at one end.

Hermes corresponds to Mercury of the Romans. He was the herald, messenger, and ambassador of the gods. He bound Prometheus to Mt. Caucasus, killed the hundred-eyed Argus, and liberated the wandering Iole. He arranged for the meeting of the three goddesses, to one of whom Paris was to give the apple inscribed "To the fairest." He conducted souls to the lower world, caused dreams, and woke the slumbering. He had grace, beauty, and plausible manners. He was practical and cunning. It cost him no effort to tell the truth or an untruth, and none to forget what he had said.

Hermes was worshipped as the god of music, dreams, theft, science, commerce, invention, and as the patron of travelers and rogues. He protected herdsmen, the tortoise, pig, lamb and goat, the ibis and the gull. The palm tree, blackthorn, and purslane were sacred to him. In the best day of Greek art he was represented as an athletic, beardless youth, with a careless, happy, crafty countenance. He had little if any drapery. A cloak hung on his farther shoulder; his boots were winged, indicating his swiftness as a messenger. He held a purse of money in his hand; a tortoise, a palm tree, and a goat were placed at his side. The statues of the god were provided with lamps. As night fell the worshiper who desired the god's favor filled and lit a lamp, at the same time not forgetting to leave a small coin for the priesthood.

See MERCURY.

Hermit. See ANCHORITES.

Hermit Crab. See CRAB.

Hero and Leander, in Grecian legend, a maiden and her lover whose names are always mentioned together. Hero lived in the town of Lesbos, on the Thracian coast, and was a priestess of Aphrodite. Leander lived in Abydos on the coast of Asia. Since Hero was a priestess her parents regarded her lover with disfavor. Every night Leander swam the Hellespont to visit Hero, who placed a light in a high tower to guide him as he swam across the strait. One stormy night the light went out. Leander was drowned. Hero looking from the tower saw his dead body as the waves rolled it to the shore. She cast herself from the tower in despair and perished in the sea. It was at one time regarded as impossible for a man to swim the Hellespont, but Lord Byron proved it possible by doing it himself. He has told the story of Hero and Leander in the *Bride of Abydos.* Schiller, Moore,

and other poets have made use of this story in their writings.

The night-wind is moaning with mournful sigh,
There gleameth no moon in the misty sky,
No star over Helle's sea;
Yet, yet there is shining one holy light,
One love-kindled star through the deep of night,
To lead me, sweet Hero, to thee.
—Moore.

Herod, the name of a family forming the last of the Jewish dynasties. The founder of the line was by far the most notable of these kings. He was appointed governor of Galilee by his father Antipas, a king of Edom made by Julius Caesar procurator of Judea. Ten years later, in 37 B. C., by successfuly furthering the interests of the Romans, Herod secured for himself the kingship of Judea. His reign, though successful politically and materially and one of great magnificence, was a series of bloody intrigues and horrid crimes. Even his family hated, feared, and plotted against him. He had married the beautiful Mariamne, granddaughter of the high priest. Twice before setting out on a journey he ordered that if anything serious should befall him Mariamne be put to death. The wife discovered the cruel command and on his return would none of him. Infuriated, he had her executed, and fell into a violent illness from which he never recovered. Almost his first act had been the execution of all but two of the Sanhedrin, the great council of the Jews. Though he rebuilt the temple, he flaunted over the great doorway the golden eagle of Rome, whence it flung a personal insult to every passing Jew. He died in 4 B. C. the year of the birth of Christ, which antedated by four years the time since set as the beginning of the Christian era. Among the last of his dreadful deeds was the order, through jealousy of the infant Christ, for the massacre of every Hebrew boy under two years old.

Herod Antipas, a son of Herod the Great, by Malthace, a Samaritan wife. After his father's death he governed Galilee and Peraea. He it was to whom Jesus was sent by Pilate to be tried. Herodias, mother of Salome, and she through whose artifice John the Baptist was beheaded, was his wife. He had been married first to an Arabian princess, but was fascinated while in Rome by Herodias, the wife of his brother Philip, and married her. The Arabian wife, outraged, fled to her father, and his armies completely routed those of Herod. In various other ways Herodias proved the king's evil genius, finally bringing about his exile which she shared with him of her own accord.

Herod Philip, a son of Herod the Great by Cleopatra of Jerusalem. He is not the Philip who was Herodias' first husband, but was married to her daughter Salome. As his share of his father's dominions he received Ituraea and other districts northeast of the Jordan, of which he was tetrarch. He was a good ruler, the builder of many cities, among them Caesarea Philippi. After his death his domain became part of the province of Syria. See AGRIPPA; JESUS CHRIST.

Herodotus, a Greek historian. He is called the father of history. He was born at Halicarnassus, 484 B. C. While a young man he traveled extensively in Egypt, Palestine, and Asia Minor, going as far eastward as Babylon and Susa. He became involved in the factional politics of his native city, and withdrew to Athens and afterward to Thurii, Italy, a Greek colony. Here he wrote his immortal *History of the World* in nine volumes. His general purpose is to narrate the conflict between the Greek and the Persian civilizations. He begins with the mythical history of the two races, describes the kingdom of Croesus, king of Lydia, the rise of the Persian monarchy, the Egyptian campaigns of Cambyses, and relates in detail the events of the Persian War. The writing of Herodotus is notable for excellence of language and breadth of view. He aims to show that the war between the Greeks and the Persians did not come about by accident; that it was not the result of proximity or of ambition; but that it was an irrepressible and unavoidable conflict between two different races, representing two types of civilization. Herodotus did not confine himself to the narration of military events. He thought it worth while to describe the wheat of Mesopotamia and training of the Persian youth to ride, to use the bow, and to tell the truth. The overflow of the Nile and the use of the papyrus

plant attracted his attention. See THUCYDIDES.

Heroic Age, The. See HESIOD.

Heron, a wading bird allied to the stork, but more closely akin to the bittern. There are several species in North America. The largest, the great blue heron, fifty inches high, breeds locally as far north as the Arctic Circle. It is incorrectly called the blue crane. The heron flies with head drawn in, the crane with neck stretched out to its full extent. The Gulf States, especially Florida and Louisiana, were the paradise of the smaller herons until the craze for plumes to adorn millinery caused the hunters of the South to slaughter these birds by the thousand. At least five species are found throughout the Mississippi Valley. The heron's nest is a platform of sticks in a bush or tree-top. Eggs three to six. The poet Lowell took delight in a colony of herons that nested in the tree-tops of Elmwood. Each heron has its own fishing ground, but the birds nest at night in "rookeries." Minnows, frogs, and reptiles are favorite food. Some species stand motionless watching for prey, which they transfix with a lightning-like stroke of the long sharp bills. Other species chase about noisily, trusting to catch the confused inhabitants of shallow water by rapid pursuit. In English literature we find frequent mention of taking the heron with a falcon. In England it was esteemed as a table bird, and was protected by game laws. The blue heron of Japan plays an important part in local art. It is of frequent occurrence in the decoration of screens, jars, vases, plaques, and fans. See FALCON.

Herrick, Robert (1591-1674), an English poet and clergyman. He was born in London and received his education at Cambridge. He studied law, but later entered the church and received the living of Dean Prior, Devonshire. He began to write poems when a young man, but the first collected edition was published in 1648 under the title *Hesperides.* For many years his poems suffered an undeserved neglect, but interest in them revived in the latter part of the eighteenth century. As a writer of pastoral lyrics Herrick has never been excelled by any English author. He wrote about 1,300 poems, every one short, some of them of little or no value, but among them many beautiful songs, exquisite in finish. He has been compared to Anacreon, and the work of the American poet, Thomas Bailey Aldrich, has been said to resemble that of Herrick.

You say to me-wards your affection's strong;
Pray love me little, so you love me long.

Gather ye rosebuds while ye may,
Old Time is still a-flying,
And this flower that smiles today
Tomorrow will be dying.

Herrick, Robert Welch (1868-), an American college professor and author, whose novels give broad pictures of American life and are much concerned with such problems as marital disharmony and the clash between commercialism and idealism Professor Herrick was born at Cambridge, Mass., and was graduated from Harvard University in 1890. From that year until 1893 he was instructor of rhetoric at the Massachusetts Institute of Technology. Since 1893, Professor Herrick has been identified with the University of Chicago, where he has been professor of English since 1905. He possesses a fine literary sense and an unusual power of character delineation. His works include *The Common Lot, Together, The Healer, One Woman's Life, The Gospel of Freedom, The World Decision, The Conscript Mother, Their Child,* and other novels and short stories.

Herring, a deep-sea food fish about twelve inches long, generally considered the world's most important sea food. Though there are several species of herring, the one best known has a slender, tapering body, blue upper parts and silvery underparts, and large, thin scales. In the autumn, usually about November, herring come in from deep water to spawn in the shallow shore water, and it is then that they are taken. The chief centers of the herring industry are the north Atlantic Ocean and the North Sea, where English, French, Swedish and Norwegian boats are to be found in large numbers during the fishing season. Herring are smoked, salted and eaten fresh, and are also converted into fertilizer. Oil of a high grade is obtained from herring and used as a lubricant.

Herschel, her'shel, **Sir William** (1738-1822), an eminent astronomer. He was born at Hanover, Germany. He served as a musician in the army. He came to England in 1757 and obtained employment first as a bandmaster. He employed his leisure time in studying mathematics and astronomy. In 1774 he made himself a reflecting telescope. During our Revolutionary war he was enthusiastically engaged in mapping the heavens. George III gave him a pension enabling him to devote his entire time to astronomy. In 1787 he completed a telescope, the largest then known. It was forty feet in length and four and one-half feet in diameter. It weighed over a ton. With this instrument he discovered an extinct volcano on the surface of the moon, two satellites of Saturn, and the planet Uranus. He established the fact that Saturn's rings revolve, and made many other minor observations and discoveries. He mapped no less than 5,000 nebulae and clusters of stars new to astronomy. His sister Caroline worked with him. She herself discovered five new comets. She also drew up a catalog of the stars, and deserves to shine by reason of her own light. Sir William's work was continued by his only son, Sir John. The latter had the advantage of excellent instruments, and began work where his father left off. His first contribution to astronomical science was the study of the stars in the southern hemisphere—stars never seen by residents of the north. He spent four years near Capetown. He was made president of the Royal Astronomical Society. At his death in 1871 he was honored with burial in Westminster Abbey. The Herschels are credited with laying the foundation of modern astronomy. They began the work of mapping the heavens accurately.

Hertz, Heinrich (1857-1894), a noted German physicist. As a student at Berlin in 1880 he came under the influence of Helmholtz, which determined his later career. His work while here on the inertia exhibited by electricity was especially creditable. Two years were spent as a lecturer in physics at Kiel, then four years at Carlsruhe, when, in 1889, he became professor of physics at the University of Bonn. The year previous he made known his immortal work on the relation between light and electricity which had been prophesied by Maxwell in his interpretation of the work of Faraday. In this he demonstrated that electricity can be transmitted in electromagnetic waves with approximately the same velocity as light waves. This production and detection of electromagnetic waves by Hertz was the beginning of that experimentation which gave us wireless telegraphy and other electric wave phenomena.

Herzegovina. See JUGO-SLAVIA.

Hesiod, hē'sĭ-od, a Greek poet about 800 B. C. It is uncertain whether Hesiod should be regarded as a poet next in age to Homer, or whether the name best represents a school of versifiers about the foot of Mt. Helicon. At all events, certain relics of poetry remain, notably *Works and Days,* in which the degeneracy of modern, that is to say, Hesiod's time is deplored. Five distinct ages in the downfall of man are recognized. First a Golden Age of patriarchal simplicity, during which peace and fruitfulness prevailed without labor, and spring was eternal. This age was governed by Cronus. Then came a Silver Age, a lawless age governed by Zeus, during which the year was first divided into seasons, and man was obliged to forsake his ease for sowing and reaping, and the surface of the earth was divided into private fields. In the Brazen Age, or reign of Poseidon, war and violence prevailed. The Heroic Age was the age of the Homeric traditions, the siege of Troy, the wanderings of Ulysses, and of great doings at Thebes. Ares reigned among the gods during the Heroic Age. The last, or Iron Age, in which Hesiod supposed himself to live, was an age in which justice and purity had fled the earth. Hades, the Roman Pluto, was in charge of this age. The times were so degenerate, vice so rampant, that any change at all could not fail to be for the better. Thus we see that despondent writers who depict the downfall of society are not confined to the twentieth century. Greek writers called Hesiod the poet of the helots; Homer, the poet of warriors. See GOLDEN AGE.

Hesperia, hĕs-pē'rĭ-a, the western land. Italy was so called by the ancient Greeks. Later the Romans gave the name Hesperia

to Spain, because it was to them the western land.

Hesperides, hĕs-pĕr′ĭdēs, the maidens who guarded the golden apples given by Gaea (Earth) to Hera on her marriage. The accounts of these maidens vary. Some mention three of them, others give four, and still others seven. Hesiod speaks of them as the daughters of Night. Other accounts name Atlas as their father and Hesperis as their mother. Again they are said to be the daughters of Hesperus. The garden where the golden apples grew was believed to be at the extreme western limit of the world. The maidens were aided by the hundred-headed dragon, Ladon. While fifty of his heads watched, the other fifty slept. Hercules was assigned the task of obtaining these apples as his twelfth labor.

Hesperus, hĕs′pĕr-ŭs, or **Hesper.** See LUCIFER.

Hesse-Darmstadt, in the former German Empire, a grand duchy in the western part, whose territory is cut in two by a strip of Prussian land. It is now the state of Hesse. It consists of eleven scattered bits of territory and two chief divisions, Oberhessen north of the Main, and Rheinhessen and Starkenburg south of that river, separated from each other by the picturesque Rhine. Agriculture is the chief industry, though about a third of the state is forest-covered, and in the northern part are good mines of coal, iron and salt. There are prosperous manufactories of leather, cigars, metal articles, sugar, etc. Agriculture, however, is in every way encouraged by a government board of agriculture at the capital, Darmstadt. Grains, hay, potatoes, and fruit are extensively grown. Wine-making is also an important occupation. The historic city of Worms is located there, and the university town of Giessen.

Hessian (hĕsh′an) **Fly,** a well known insect pest. It is a small fly. It is allied to the gnat and the midge. The adult female is about one-tenth of an inch in length. The body is brown with blackish upper parts. It has dusky gray wings, surrounded with fringe. Two generations are raised in a year. In September the fly lays its eggs in growing winter wheat. The maggots hatch in from four to fourteen days. The fall generation lives over winter in the wheat field and is ready for work in the spring. It matures and lays eggs again in May, this time in the joints between the leaf sheaths and the stem. The May generation is the one that does the damage. The maggots turn into pupae, known from their appearance as flaxseed, and work their way into the joints of the wheat stem. The stalk loses strength and the head falls over worthless. Of the various cereals, barley and rye are least subject to attacks of this insect. The wheat raiser dreads the Hessian fly more than he does the chinch bug. Directly and indirectly, it is said to cause the American farmer an annual loss of $50,000,000. In damp seasons certain parasites attach themselves to the Hessian flies and all but exterminate them. For a year or two the farmer's fields are comparatively free from the pest. See CHINCH-BUG.

Hestia. hĕs′ti-ä. See VESTA.

Hewitt, Abram Stevens (1822-1903), an American manufacturer and public official who introduced in America the open hearth process of steel making, and who for many years was trustee and secretary of Cooper Union, the famous New York educational institution. Mr. Hewitt was born at Haverstraw, N. Y., educated at Columbia College, and admitted to the bar in 1844. Defective eyesight barred him from practice, and he engaged in iron manufacture with Edward Cooper, son of Peter Cooper, the founder of Cooper Union. Mr. Hewitt served in Congress in 1871-79 and in 1881-86. In 1886 he was elected Mayor of New York City, defeating Henry George and Theodore Roosevelt. He labored untiringly and successfully for municipal reform, doing much to facilitate city transit in New York. In 1901 Mr. Hewitt was elected chairman of trustees at the organization of the Carnegie Institution, and in the same year was awarded a gold medal for civic service by the New York Chamber of Commerce.

Hewlett, Maurice Henry (1861-), an English author. He was born in London and received his education at the London International College. He studied law and was admitted to the bar. His first published volume was *Earthwork out of Tuscany,* which appeared in 1895. Several volumes

relating to life in Italy during the middle ages followed. His first popular story was *The Forest Lovers,* of which James Lane Allen says that its "style alone is an extraordinary achievement." *Life and Death of Richard Yea-and-Nay* is a glowing romance of the Crusaders and Richard Coeur de Lion.

Hezekiah, the twelfth King of Judah. He succeeded Ahaz about 726 B. C., when he was 25 years of age, and died about 698 B. C. Upon ascending the throne he instituted many reforms and improvements. The aqueducts of Jerusalem were constructed during his reign. Hezekiah showed much zeal in taking the offensive against the Philistines, whereby he re-won many of the cities lost by his father. The greater part of the Scripture story bearing on the reign of Hezekiah relates the two invasions of his country by Sennacherib, in the last of which Judah was delivered through the prayers of the pious Hezekiah. But the king did not long survive this deliverance, for after a reign of nearly 29 years he died at the age of fifty-four. His death was universally mourned, for he was one of the great rulers of Judah. Hezekiah's reign has been called the golden age of prophetic poetry, for among his contemporaries were the prophets Isaiah, Nahum and Micah. Much literary activity prevailed during Hezekiah's reign, though it is not known that he wrote anything.

Hiawatha, hē-a-wä′tha, **The Song of,** a narrative poem by Henry Wadsworth Longfellow, published in 1855. The poem is based upon the legends of the North American Indians and was the first successful poem making use of this material. Hiawatha is a mythical character, known by that name among the Iroquois and by other names among other Indian tribes. He is believed to have been of miraculous birth, and to have been sent to clear the rivers and lakes, open up the forests, and to teach his people the arts of peace. In the Indian legends he displays certain capricious characteristics which are wholly lacking in Longfellow's conception, which idealizes the hero in a way to remind one of Tennyson's King Arthur. The poem consists of an introduction and twenty-two sections or chapters recounting the story of Hiawatha—whom Longfellow makes an Ojibway—from the incidents connected with his birth, through his life, to the coming of the white man and the departure of

> Hiawatha the Beloved
> To the Islands of the Blessed
> To the Kingdom of Ponemah
> To the land of the Hereafter.

Many beautiful legends and fanciful customs of the Indians are here brought together in an attractive and lasting form. The meter of the poem, called trochaic tetrameter is adapted from that of the Finnish *Kalevala,* of which Longfellow had made a study. It is without rhyme or stanza, containing four accented syllables to a line, and is characterized by short phrases, simple sentences, and frequent parallelism; that is, the partial repetition of lines. This form of poetry was entirely new in America, and, although immediately popular, *Hiawatha* called forth a great deal of ridicule and some even bitter criticism. The numberless parodies, however, which were written on it have long since died natural deaths, while *Hiawatha* lives and will live to open up a new world of enjoyment to every reader of American literature. Longfellow never visited the region on the southern shore of Lake Superior, where the scenes of the poem are laid; he never saw Minnehaha Falls; his material was obtained from the writings of Henry Rowe Schoolcraft; the form of his poem was borrowed from the Finns; and yet this poem is his most distinctively original work, and has been said to be "more redolent of the primitive soil of America than anything else in our literature."

Ten thousand copies of the poem were sold during the first four weeks after its appearance. It has been translated into nearly all modern languages, and into Latin. It has been called "America's national epic poem," and ranked with the Anglo-Saxon *Beowulf* and the French *Chanson de Roland.* Edmund Clarence Stedman says of it:

> Hiawatha is the one poem that beguiles the reader to see the birch and ash, the heron and eagle and deer, as they seem to the red man himself, and to join for the moment in his simple creed and wonderment.

See LONGFELLOW; SCHOOLCRAFT.

Hibben, John Grier (1861-), an American educator, chosen President of Princeton University in 1912, succeeding Woodrow Wilson. He was born at Peoria, Ill., and was educated at Princeton University, Princeton Theological Seminary and the University of Berlin. Dr. Hibben was ordained to the Presbyterian ministry in 1887, but in 1891 became professor of logic and psychology at Princeton University. Dr. Hibben's philosophical works include *Inductive Logic, Problems of Philosophy, Deductive Logic, The Higher Patriotism,* and *A Defense of Prejudice.* He also edited the series by British and American authors known as *Epochs of Philosophy.*

Hibbing, Minn., a mining city, is eighty-four miles northwest of Duluth, on the Duluth, Missabe & Northern and the Great Northern railroads. Hibbing is situated in the famous Mesaba Iron Range, which yields about half of the iron ore produced in the United States. Several large and valuable mines lies within the limits of the city. The population of the city is largely foreign born. The water works and electric light plant are the property of the municipality. Population in 1920, 15,089.

Hibernation, the prolonged winter sleep of certain animals. This habit is due to the annual cold of winter and the scarcity of food. A number of warm-blooded animals hibernate, a few fishes and many reptiles. The squirrel, though he stores winter food, hibernates intermittently, coming out in the warmer weather. Prairie dogs behave in the same fashion. During hibernation the body does little of its ordinary work; the heart action is slight and the temperature low. Animals usually lose a third or more in weight. The bear is the best-known hibernator, though skunks, dormice, woodchucks, bats, and badgers seek permanent winter quarters, often in an old log or hollow tree. A few fishes bury themselves in mud at the buttom of the water; toads, frogs, lizards, snakes, and a few other reptiles crawl into the earth where the frost cannot penetrate.

During the period of drouth and heat in the tropics certain creatures go into a similar torpid state; there it is evidently caused by heat, instead of cold, plus lack of food.

Hiccup or **Hiccough,** hĭk′up, a spasmodic movement of the diaphragm, brought suddenly to a stop by the closing of the cleft between the vocal cords. It is caused by some abnormal irritation of the phrenic, that is, the diaphragmatic nerve. The ordinary case of hiccup is little more than a momentary inconvenience, resulting from indigestion. Occasionally it assumes a more serious character and becomes difficult to stop. In such instances it is the symptom of some diseased condition indicating the need of a physician. Ordinary cases of hiccup may be relieved by drinking cold water, or by holding the breath for a few seconds.

Hichens, Robert Smythe (1864-) an English novelist whose *Green Carnation,* a satire on the decadents, published anonymously in 1894 and attributed to Oscar Wilde, created a sensation in London. He was born at Spildhurst, Kent., and received a thorough musical education. While studying music, he wrote lyrics for music, and a number of short stories, and finally abandoned music for literature. Mr. Hichens then studied for a year at the London School of Journalism. His *Green Carnation* was followed *by An Imaginative Man, Flames, The Prophet of Berkeley Square* and *The Garden of Allah.* The latter book was dramatized and presented in New York, starring Madame Nazimova. Mr. Hichens has collaborated in such successful plays as *Becky Sharp, The Medicine Man* and *The Daughters of Babylon.* Hichens' *The Spell of the Holy Land* was published in 1914.

Hickory, an American tree of the walnut family. Hickory is an Indian name. There are in all ten hickories—nine in the eastern United States and Canada, one in Mexico. The principal kinds are the shagbark, the shellbark, the bitternut, the pignut, and the pecan. The pecan is a southern tree. In sections the pecan is an important article of commerce. It brings in more money than any other native American nut-bearing tree. The pecan nut crop is over 3,000,000 pounds a year. The kernels

are sweet. The timber is of little value. Shagbark and shellbark hickory nuts are fine winter nuts. They are produced chiefly in the latitude of the Ohio Valley by trees 80 to 100 feet high. The pignut is fair in quality; bitternuts are produced farther north and are not desirable. Hickory timber is proverbial for hardness and toughness. It is the heaviest of North American woods. It weighs about fifty pounds to the cubic foot. It is in demand for axhelves, ox-bows, hubs, felloes, spokes, fork-handles, axles, and sleigh material. It is estimated that 250,000,000 feet of hickory is consumed annually for the purposes named. The end of the supply is so nearly at hand that manufacturers are alarmed. The people of the West were able to pay no higher tribute to the sterling qualities of Andrew Jackson than to dub him "Old Hickory." See PECAN.

Hieroglyphics, hī-er-ō-glif'ĭks, pictorial writing. Literally, sacred carving or writing. The name was first applied to the symbolic writing of the Egyptians. It consisted largely of pictures of animals, plants, and other objects. From the inscriptions on timbers, tombs, mummy cases, etc., over 1,000 characters have been made out. They were used as we use our letters and words. The hieroglyphics are either left in relief by the cutting away of surrounding material, or they are sunk below the surface, or else they are traced, that is to say, painted, with a reed pen. Black ink, made from bone charcoal, and red mineral ink were used. When combined in writing, the animals and representations all face toward the beginning of the sentence. The reader meets them face to face, as it were. They are placed together very neatly, so as to cover a space almost as evenly as print. There are several hundred pictures used to represent words or ideas; ideographs, they are called. For instance, the picture of a dog means dog; a woman beating a tambourine means joy; a picture of a jackal means either a jackal or cunning, according to the sense of the sentence. A wading bird indicates fishing. A precious stone of any sort is indicated by a circle or a ring; walking, by two legs. There was another method—a system of spelling by sound. It may be illustrated readily by means of the word Kleopatra. Nine pictures are required to represent the nine sounds of which the word is composed. *K* is represented by a picture of a knee; *l,* by a lion; *e,* by a reed; *o,* by a noose; *p,* a mat; *a,* an eagle; *t,* a hand; *r,* a mouth; and *a,* by an eagle again. To show that Kleopatra is a woman, not a man, the picture of an egg is added. The two methods are combined freely, so that a sentence may be partly pictorial, and may be spelled out in part by signs of sounds. In later times Egyptian scholars wrote what might be called more of a running hand, in which the original pictures were not recognizable. In this connection it may be said that some of the letters in our own alphabet were originally the pictures of animals and the like. The language of the hieroglyphics, that is to say, the language of the writers in these queer characters, was spoken until the middle of the eighteenth century by the Copts, a people of Egyptian descent. The Aztec people of Mexico had a well developed system of hieroglyphics or picture writing. See ROSETTA STONE.

Higginson, Thomas Wentworth (1823-1911), an American author, was born in Cambridge, Massachusetts. He took a degree at Harvard in 1841, and six years later graduated from the Harvard Divinity School. He became pastor of a Unitarian Church at Newburyport, but, becoming prominent in the anti-slavery agitation, he resigned his pastorate, realizing that his views were unacceptable to his congregation. During the Civil War he was captain of the 51st Massachusetts regiment of volunteers. In 1862 he was made colonel of the First South Carolina volunteers, the first regiment of freed slaves. He was obliged to resign from the army before the close of the war on account of disability. Since that time he has devoted himself to literature. Among his works are: *Young Folks History of the United States, Larger History of the United States, The Monarch of Dreams, Cheerful Yesterdays, Life of Margaret Fuller Ossoli,* and *Life of Henry W. Longfellow.* Mr. Higginson also published several volumes of poetry: *The Afternoon Landscape* and *Such as They are,* the latter in collaboration with Mrs. Higginson. His principal work in fiction is *Melbourne, an Oldport Romance.*

INDIAN PICTURE WRITING

A CEREMONIAL SONG OF THE OJIBWAYS

EGYPTIAN PICTURE WRITING

NUBIAN CHIEFTAINS PAYING TRIBUTE TO THE EGYPTIAN KING

High School, that part of a system of public instruction that follows the common school or grades. The first secondary schools of America were private academies. They were college preparatory schools. The typical course contained Latin, Greek, French, English, mathematics, science, history, etc., not essentially different from the academy of today, save that the subjects were in an undeveloped condition. Noted academies were opened in Philadelphia in 1751 and at Andover in 1778. The earliest public secondary schools in America were known as grammar schools. These schools made a specialty of the grammar of Latin, whence the name, and were chiefly preparatory to college. They were general throughout the colonies and were particularly strong in New England.

The first public school organized as an extension of the common school system, not as a college preparatory school, was the Boston English Classical School, afterward known as the English High School. It was founded in 1821. The latter name was employed in 1824. The school committee to which the town meeting had referred the subject for investigation expressed itself as of the opinion that the branches of knowledge taught in the grammar schools, that is to say, the grammar grades, "are not sufficiently extensive nor otherwise calculated to bring the powers of the mind into operation nor to qualify a youth to fill usefully and respectably many of those stations, both public and private, in which he may be placed." The committee made a specific recommendation for the opening of a new school and presented the following plan of organization:

1. That the time for pursuing the course of studies proposed be three years.
2. That the schools be divided into three classes and one year be assigned to the studies of each class.
3. That the age of admission be not less than twelve years.
4. That the school be for boys exclusively.
5. That candidates for admission be proposed on a given day annually; but scholars with suitable qualifications may be admitted at any intermediate time to an advanced standing.
6. That candidates for admission shall be subject to a strict examination, in such manner as the school committee may direct, to ascertain their qualifications according to these rules.
7. That it be required of every candidate, to qualify him for admission, that he be well acquainted with reading, writing, English grammar in all its branches, and arithmetic as far as simple proportion.
8. That it be required of the masters and ushers, as a necessary qualification, that they shall have been regularly educated at some university.

The course of study of this first American high school was:

First Class. Composition, reading from the most approved authors, exercises in criticism, composing a critical analysis of the language, grammar, and style of the best English authors, their errors and beauties, declamation, geography, arithmetic continued.

Second Class. Composition, reading, exercises in criticism, declamation, algebra, ancient and modern history and chronology, logic, geometry, plane trigonometry and its application to mensuration of heights and distances, navigation, surveying, mensuration of surfaces and solids, forensic discussions.

Third Class. Composition, exercises in criticism, declamation, mathematics, logic, history, particularly that of the United States, natural philosophy, including astronomy, moral and political philosophy.

In 1825, in New York, a high school for boys was opened, and during the next year a school for girls; but there was a strong sentiment that the public should not be called upon to pay for this stage of education, that high schools were interfering with academies; so the New York City high schools were discontinued and were not revived until 1897. High schools were opened at Philadelphia, 1838; Baltimore, 1839; Charleston, South Carolina, 1839; Providence, co-educational, 1843. The first St. Louis high school was organized in 1853; the first in Chicago in 1856. Michigan was the first state to establish a system of public instruction in which the high school was assigned a definite position intermediate between the common school or grades and the state university. Other states adopted the same plan. Beginning about 1860 the number of high schools increased rapidly. There were in 1870, 160 high schools; in 1880, 800; in

1890, 2,526; in 1900, 6,005; in 1905, 7,576. The natural consequence was that the high school took over the college preparatory work of the academy, and for decades lost sight of its original function, namely to provide advanced instruction for students not intending to go to college.

The proper sphere of the high school was defined well by the Committee of Ten appointed by the National Educational Association which reported in 1893:

> The secondary schools of the United States, taken as a whole, do not exist for the purpose of preparing boys and girls for colleges. Only an insignificant percentage of the graduates of these schools go to colleges or scientific schools. Their main function is to prepare for the duties of life that small proportion of all children of the country—a proportion small in numbers, but very important to the welfare of the nation—who show themselves able to profit by an education prolonged to the eighteenth year, and whose parents are able to support them while they remain so long at school. . . . A secondary-school program intended for national use must therefore be made for those children whose education is not to be pursued beyond the high school. The preparation of a few pupils for college or scientific school should in the ordinary secondary school be the incidental, and not the principal object.

Aside from laboratory fees exacted in a few schools to cover breakage of glassware, tuition is free. A few schools are endowed. In states having a school fund at interest high schools share in a per capita apportionment of a few dollars annually. A few states subsidize the high schools by a special grant out of the state treasury. Minnesota, for instance, grants a specified sum annually to each high school maintaining a required standard, but ordinarily the American high school is maintained by direct taxes levied on the assessed property of the city, township, or county, constituting the high school district.

Junior High School. The Junior high school includes the seventh and eighth grades and the first year of the regular high school. It is the outgrowth of a recent movement to reorganize the American public schools on what is known as the "six-and-six" plan in which the twelve years covered by the graded and high schools are divided into six-year periods.

The Junior high school has become established in our educational system.

In 1918 there were 84,822 teachers and 1,735,619 pupils in the public high schools of the U. S. In this year the total cost of instruction was $97,437,127, of which $89,512,588 represents salaries. The number of high schools reported in that year was 13,951. In 1920 the enrollment had increased to 2,181,216.

Miss Sara Burstall, of Manchester, England, in her *Impressions of American Education* says:

> But whatever cities or states the English teacher may study he cannot fail to be impressed by the extraordinary uniformity which is so marked and astonishing a feature in American life—a uniformity which much simplifies his work. There is, for example, more uniformity in the high school history course of study, over an area from Minneapolis to Boston, and from Washington to St. Louis (which takes two days and nights to cross by train), than in the half-dozen secondary schools in the one city of Manchester. This is not a matter of law; it is a matter of common consent,—of the voluntary adoption of a history course drawn up by a voluntary representative committee of teachers of history. We in England are much more independent and self-assertive than our American colleagues. We each like our own way of doing things; as English ladies like to dress each in her own style, from our queens downward. The uniformity of the dress of American women and girls, charming and dainty as they are, becomes oppressive after a time to an Englishwoman—as does the uniformity of their school equipment. All the best schools have the same things, which are, it is presumed, the best at that particular time, as is the prevailing hat, or shirt waist, or set of furs.

The most recent tendencies in high school development may be said to be the very general introduction of commercial and industrial features. Wood work, iron work, cooking, sewing, and subjects once seen only in business schools are becoming common. Agriculture is a recent claimant for place. Over three-fourths of the agricultural colleges have agricultural high schools connected with them, and outside of large cities, practically all high schools give instruction in this subject. Vocational training has become general in the high schools throughout the country.

Geographically, high schools are not confined to any sections of the country. The high school movement started in New England, was taken up most enthusiastically in the Middle West, became most nearly the exclusive form of secondary ed-

ucation in the New Northwest, and took root last of all in the former slaveholding states where the need of providing a double system of education on account of the color line is a heavy handicap.

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High Seas, a term used to designate the open, or free sea, that is, the part of the ocean which is accessible to all nations on equal terms. Differences of opinion as to how far from shore the rights of ownership should extend have occasioned long and bitter controversies in the past, but the general international principle is now accepted, that the jurisdiction of maritime nations extends to a distance of three miles from their coasts.

Hilda, Saint (614-680), an Anglo-Saxon abbess. She was a member of the royal family of Northumbria. She was head of the abbey of Hartlepool, and later of the famous monastery of Whitby, which she founded in 658. For twenty-two years she ruled this community of monks and nuns with marked ability. St. John of Beverly and the poet Caedmon are among those whose names are remembered in connection with this monastery, which, in St. Hilda's time, was probably the strongest religious house in Great Britain. For many years a tradition was current at Whitby that, when on a summer afternoon the sun shone on the high windows in the north part of the abbey, Saint Hilda's figure could be there discerned.

Hildebrand. See GREGORY VII.

Hill, Benjamin Harvey (1823-1882), an American statesman. He was born in Jasper County, Georgia. His education was received at the university of that state. In 1851 he was sent by the Whigs to the state legislature. Though he opposed secession, when Georgia withdrew from the Union he followed his state and was elected to the first Confederate Congress in 1861. During the years following the war he opposed congressional reconstruction vigorously. In 1875 he was sent by the Democrats to the House of Representatives, and two years later entered the Senate, where he served until his death.

Hill, David Bennett (1843-1910), an American lawyer and public official who served as governor of New York and as United States Senator. He was born at Havana, N. Y., admitted to the bar in 1864, and elected to the New York Assembly in 1871. Mr. Hill took an active part in reform legislation and was a vigorous opponent of Tammany Hall. He was elected mayor of Elmira, N. Y., in 1882, and in the same year was appointed lieutenant-governor of New York State. Upon the resignation of Governor Cleveland in 1885, Mr. Hill became governor, and in 1886 was regularly elected to the office, serving until 1892. In that year he was elected United States Senator. He opposed many measures that had the approval of President Cleveland, and was a popular presidential candidate in 1892. After 1897 Mr. Hill practiced law in Albany, but continued to take an active part in politics.

Hill, David Payne (1850-), an American diplomat and historian, was born at Plainfield, N. Y., and educated at Bucknell University, of which he was president from 1879 to 1888. From the latter year until 1896 Mr. Hill was president of the University of Rochester. He then studied law and diplomacy in Europe for three years. From 1898 to 1903 he was assistant Secretary of State of the United States. In 1903 Mr. Hill was appointed American Minister to Switzerland, in 1905 Minister to the Netherlands, and from 1908 to 1911 was Ambassador to Germany. He was a delegate to the second Peace Conference at The Hague in 1907. He is a member of several learned societies. His published works include a *Life of Washington Irving, The Diplomacy of the Age of Absolutism, A History of Diplomacy in the International Development of Europe, Present Problems in Foreign Policy* and *American World Policy.*

Hill, James (1838-1916), an American railway president. He was born in

Rockwood, Ontario, his parents being ordinary Irish peasants. Of three children the subject of this sketch was the only one who displayed any marked ability. During his early boyhood he came under the influence of an English gentleman, the founder of the Rockwood Academy. To him the boy owed his acquaintance with books and the elements of his education. In 1865 Mr. Hill went to St. Paul expecting to find service with the Red River Brigade of the Hudson Bay Company. Arriving too late for that, however, he secured work as shipping clerk. From now on his advance was rapid. In 1865, he started in business for himself as steamboat and railway agent and was constantly extending the scope of that business. In 1870 in association with his partner he built a steamboat for transportation on the Red River of the North, opening up communication between St. Paul and Winnipeg. This brought him into direct competition with the Hudson Bay Company, but he pushed his own trade so vigorously that the Company combined with him and put him in charge of their transportation business on that river.

In 1873 a new opportunity presented itself. The St. Paul and Pacific railway, of which Mr. Hill had been transfer agent, went into the hands of a receiver. In 1878 the Montreal Agreement was drawn up among four men,—James J. Hill, Donald A. Smith, George Stephen, and Norman W. Kittson. In this agreement they planned to secure possession of the road by purchase of bonds and forcing a foreclosure. The plan succeeded, and the road came into the possession of the St. Paul, Minneapolis and Manitoba Railroad Company, formed by the syndicate for that purpose. That was really the beginning of his railroad career, and with the painstaking study he gave to the subject he reduced railroading to an exact science. Under his management the road began to grow, pushing always farther west, finally reaching Puget Sound. The Great Northern holds the record among trans-continental lines, not only for economy of construction, but for economy of operation. Furthermore it was built without government assistance or concessions.

Not only did Hill control the Great Northern, but he held a controlling interest in the Northern Pacific, the complete control of the Burlington, the dominant influence in the Erie Railroad, and was the owner of the Great Northern Steamship line connecting Seattle with the Orient. In October 1906, he sold to the United States Steel Corporation 700,000,000 tons of iron ore in Minnesota, a deal which will yield Great Northern stockholders $450,000,000 to $600,000,000.

Mr. Hill was not a mere railway builder; his vision lead him to the promotion of all industrial and agricultural interests in the vast territory through which his roads extend. He owned and operated large experimental farms, imported and bred stock for distribution, offered prizes for agricultural contests, and was in the greatest demand as a speaker at grain and stock growers' conventions. He did much to influence the farmers of the Northwest to favor reciprocity with Canada. His personality was that of a man who had risen by overcoming obstacles—arbitrary, lacking in sympathy for those weaker than himself, unduly exalting the rights of property, but withal clean in his methods, democratic in his manner, and loyal to an extreme to those who had trusted or assisted him. He built up, but did not tear down, and well deserved the appellation often bestowed upon him of "Empire Builder."

Hill, Sir Rowland (1795-1879), the father of cheap postage. He appears to have been a born reformer. He was born at Kidderminster. He was educated as a schoolmaster. He became interested in the establishment of a colony in South Australia, and was made secretary of a board of royal commissioners having the project in charge. He was a member of the Society for the Diffusion of Useful Knowledge. A story is current to the effect that his sympathies were very much aroused by seeing a poor woman look earnestly at a letter and hand it back to the postman. On inquiry he found that the letter was from her distant husband, and that she was too poor to pay the postage, but by arrangement with her husband he had made certain marks on the outside conveying the information that he was alive and well. Hill wrote a pam-

phlet calling attention to the high rates of postage that prevented the general use of the postoffice. He advocated a uniform rate, regardless of distance, of a penny, that is to say, two cents for all letters weighing not over half an ounce. In 1840 Parliament adopted his plan, so far as to make a uniform rate of four pence per letter. Shortly afterward the rate was reduced to a penny. Hill was made secretary to the postmaster general, and had the satisfaction of installing the new system. His prediction that the postoffice department would receive a greater income from a low rate of postage came true. Owing to a change of party in power Secretary Hill was thrown out of office. Public indignation ran so high that a purse of $65,000 was presented to him as a testimonial of the appreciation in which his services were held by the public. He was afterward reinstated. In 1860 Queen Victoria made him a baronet. See POSTOFFICE.

Hillis, Newell Dwight (1858-), a well known American Congregational clergyman, author and lecturer, was born at Magnolia, Iowa, and educated at Lake Forest University and at McCormick Theological Seminary. Entering the ministry in 1887, he was pastor at Evanston and at Peoria, Ill., until 1895, and of the Central (Independent) Church, Chicago, from 1895 to 1899. In the latter year Dr. Hillis was called to the Plymouth Congregational Church in Brooklyn, N. Y., the pulpit that had been made famous by Henry Ward Beecher. Dr. Hillis enjoys a wide reputation as a lecturer. Chief among his published works are *A Man's Value to Society, How the Inner Light Failed, Great Books as Life's Teachers, Influence of Christ in Modern Life, Contagion of Character* and *Prophets of a New Era.*

Himalaya, hĭm-ä′la-ya, the loftiest system of mountains in the world. It crosses southern Asia from northwest to southeast. The total length is about 2,000 miles. The width varies from 100 to 600 miles. The system consists chiefly of granitic rocks. It is rich in all sorts of valuable minerals. It contains the elevated plateau of Tibet, called "the Roof of the World." The headwaters of the large rivers of Asia drain its slopes. Mt. Everest, 29,012 feet, or five and one-half miles high, is probably the highest peak. On the northern side of the Himalayas, the snow line is at an altitude of about 17,400 feet; on the southern side, 16,200 feet. In 1907 Dr. Workman, a returning missionary, wrote in an interesting manner of a trip to this upper region:

> We camped at the highest altitude attained by man, 21,300 feet. From our camps on a snow plain surrounded by seven towering peaks, we ascended to a height where I stopped to take photographs as the mist was increasing, while Mrs. Workman climbed to a peak 23,300 feet above the level of the sea. Only once was this record broken, when I climbed a glacier, 23,394 feet. During the last five days of our climb the atmosphere was so rare we were unable to sleep. Avalanches in the Alps were miniature compared with those we saw in the Himalayas. Some were half a mile wide and plunged down precipitous slopes with a terrific roar. It was appalling in grandeur. I managed to make important scientific records.

The Workmans found a people of Mongolian type at a height of 10,000 feet growing rye, wheat, oats, and barley, and even at 12,000 feet they saw a village where human beings were living in huts with white goats, fowls, marmots, and strange animals. At 14,000 feet the Workmans saw only a species of partridge and a pair of chough birds. See EVEREST, MOUNT.

Hincks, Sir Francis, a canadian statesman, was born in Cork, Ireland. He was educated at Fermoy and at the Royal Belfast Institution. He removed to Canada in 1832, and settled in Toronto, where he went into the wholesale business. He became interested in politics, and founded and edited a liberal newspaper, which he called the *Examiner* (1838). In 1841 he was elected a member of the Canada Legislative Assembly, and in 1842-43 became Inspector-General. In 1844 he went to Montreal, where he established another newspaper, the *Pilot,* to which he was one of the chief contributors. Hincks was Inspector-General again in 1848-51, when he agitated for reciprocity in natural products with the United States, which was realized in 1854. He was joint Premier in the Hincks-Morin administration (1851-54.) His knowledge of commerce and finance made him one of the chief promot-

ers of a commercial treaty with the United States to develop mines and railways. Hincks was Governor of Barbadoes (1855-62), and of British Guiana (1862-69). He returned to Canada, and from 1869 to 1873 was Minister of Finance in the cabinet of Sir John A. Macdonald. Later he was editor of the *Journal of Commerce*, at Montreal. He was knighted in 1869. Among his publications are: *Canada: Its Financial Position and Resources*; *Reply to the Speech of Joseph Howe on the Union of the North American Provinces*; *Religious Endowments in Canada*; *The Boundaries Formerly in Dispute Between Great Britain and the United States* and *Reminiscences of my Public Life.*

Hindenburg, Paul von Beneckendorff und von (1847-), a German soldier who was raised by the German Emperor to the highest military rank, that of Marshal, and who was the idol of the German people during the World War. Born at Posen, he became a subaltern in 1866, distinguished himself in the war against Austria and during the Franco-Prussian War, and in 1914 was a retired general living on a pension. At one time he was a lecturer on applied tactics at the War Academy, where, because he had located some of his imaginary battles in the swampy regions of northeastern Prussia, he had been laughed at. The Kaiser called von Hindenburg from retirement in 1914, and in the same year the Marshal overwhelmingly defeated a superior force of Russians on the very scene of his imaginary victories. It was at once realized that in the Marshal lay Germany's hope of success. Von Hindenburg employed railways for the mass movement of troops, and in other ways raised the German military to a high state of efficiency. He was decorated and redecorated, and a statue was raised to him in Berlin. After Germany's defeat he did not leave the country, but refused to take part in the new government.

Hindustan. See INDIA.

Hippar'chus, the Father of **Astronomy.** He was born at Nicaea in the second century B.C. Nothing is known of his life and but little of his works, for only the less important of these are left. From the writings of Ptolemy we learn that Hipparchus by his discoveries and advanced methods really founded the science of astronomy. See ASTRONOMY; PTOLEMY.

Hippocrates, hĭp-pŏk'ra-tees (460-377 B. C.), an extraordinary medical writer of Greece. Little is known of his life beyond the fact that he was a physician on the island of Cos, that he belonged to the most intellectual period of Grecian life, and that he was singularly free from superstition. Over eighty treatises have been attributed to him, but it now is conceded that some were written by others who borrowed his name and reputation. His fame rests on a number of medical treatises which show that, had he lived at the present day he would have been one of the most progressive men of the century. His works taken together form ten volumes, an encyclopedia of medicine and surgery as known in his day. He has been called the father of scientific medicine. He did not believe in miraculous diseases or cures. He taught that proper diet is a necessity of health, and that climate has a profound influence on both body and mind. See GALEN; MEDICINE.

Hippomenes. See ATALANTA.

Hippopotamus (Greek, river horse), a ponderous aquatic quadruped. Of the three huge hog-like animals of Africa, the ugliest and most forbidding is its river-horse. It is about five feet high. The body is shaped not unlike that of an elephant or a rhinoceros, and is rather between them in weight. The skin is about two inches thick on the back and sides, and is almost hairless, but is lubricated by a sort of oil exuded through the pores. The legs are ponderous and very short. The feet are broad. Each terminates in four separately hoofed toes. The head is enormous. The eyes are set well up, so that the hippopotamus can raise them above the water without exposing much of its head. The snout is large, having swollen lips and a set of large front teeth. The canine teeth are curved forward. They furnish ivory of superior quality, reaching a length of two feet and a weight of about six pounds each.

The hippopotamus is a good swimmer, and is able to dive, remaining under water

for a considerable length of time. The young hippopotamus, pink, and as fat as a pig, rides on his mother's shoulders. He is a good diver too. When he wants his dinner he plunges beneath his mother's body. He seems able to remain there an indefinite length of time. The hippopotamus conceals itself in the water during the day time, and ranges abroad in herds at night for vegetable food. It is considered exceedingly destructive. It is found only in the rivers and ponds of Africa. It was formerly abundant and was much hunted by the natives both for its flesh and for ivory, but its range has lately been restricted to the upper Nile and to interior, inaccessible waters.

The hippopotamus was shown in Europe for the first time about 1850. The huge, waddling, three-ton hippopotamus is entirely too large for capture and transportation. The hippopotamus of the menagerie is taken when small and is reared for show purposes. The hunters in their canoes catch sight of a likely chap riding on his mother's back in the river. They close in and kill the mother with a harpoon. When her struggles are over they capture the little fellow, who stays by his mother's side, squealing to the last. They put him in a tank cage and supply him with goat's milk. When old enough to live on a partly vegetable diet he is shipped over seas, probably to Hamburg. With proper care the young prisoner becomes quite friendly and playful. The business of hunting the hippopotamus is not without danger. When infuriated by wounds or pursuit the adult rushes upon the hunters, and is quite capable of crushing the largest rowboat with a single snap of the jaws. The unlucky hunter who comes in the way meets the same fate. A well grown menagerie hippopotamus is valued at $15,000.

We were soon among the hippopotami. Every two or three hundred yards, and at every bend of the river, we came upon a herd of from five to twenty. To us in a steam launch they threatened no resistance or danger. But their inveterate hostility to canoes leads to repeated loss of life among the native fishermen, whose frail craft are crumpled like eggshells in the snap of enormous jaws. Indeed, all the way from here to Nimule they are declared to be the scourge and terror of the Nile. Fancy mistaking a hippopotamus—almost the largest surviving mammal in the world—for a water-lily! Yet nothing is more easy. The whole river is dotted with floating lilies detached from any root and drifting along contentedly with the current. It is the habit of the hippo to loll in the water, showing only his eyes and the tips of his ears, and perhaps now and again a glimpse of his nose, and thus concealed his silhouette is, at three hundred yards, almost indistinguishable from the floating vegetation. I thought they also looked like giant cats peeping. So soon, however, as they saw us coming round a corner and heard the throbbing of the propeller, they would raise their whole heads out of the water to have a look, and then immediately dive to the bottom in disgust. Our practice was then to shut off steam and drift silently down upon them. In this way one arrives in the middle of the herd, and when curiosity or want of air compels them to come up again there is a chance of a shot. One great fellow came up to breathe within five yards of the boat, and the look of astonishment, of alarm, of indignation, in his large expressive eyes—as with one vast snort he plunged below—was comical to see. These creatures are not easy to kill. They bob up in the most unexpected quarters, and are down again in a second. One does not like to run the risk of merely wounding them, and the target presented is small and vanishing. I shot one who sunk with a harsh sort of scream and thud of striking bullet. We waited about a long time for him to float up to the surface, but in vain, for he must have been carried into or under a bed of reeds and could not be retrieved.—Winston Churchill, M. P., in the *Strand Magazine.*

See RHINOCEROS; ELEPHANT; TAPIR.

Hirsch, Emil Gustav (1852 - 1923), an American rabbi, from 1880 until his death minister of Sinai Congregation, Chicago. He was born in Luxembourg, removed to the United States in 1866, and was graduated from the University of Pennsylvania in 1872. He subsequently studied in Berlin and Liepzic. Dr. Hirsch was president of the Chicago Public Library Board during 1888-97, and professor of rabbinical literature at the University of Chicago from 1892 to 1923. He edited several Jewish papers that advocate religious reform. Under Dr. Hirsch's guidance the New Sinai Center developed a wide range of social activity.

Hirsch, Maurice, Baron de (1831-1896), an Austrian-Jewish capitalist and philanthropist. He was born at Munich, of wealthy Jewish parents. His fortune of about $200,000,000 was made in a great Belgian banking house, and in Turkey where he engaged in railway building. Nearly half of this great amount was spent

for the benefit of Jews all over the world. The sum of $50,000,000 was given by him for the founding of Jewish colonies in Armenia. The United States has a Hirsch fund of $2,500,000 to be expended in Americanizing and educating Russian and Roumanian Jews. The sum of $10,000,000 was offered to Russia for founding schools, on condition that no pupil be shut out because of race or religion, but the government of that country refused the gift.

Hispania, an old Latin name for Spain. It is used often in poetry.

Histology. See ANATOMY.

History, a narrative of past events. The word story is but an abbreviated form of the word history, but common usage applies history to such narratives only as are true. As a science, history has come to mean systematized knowledge of the development of human civilization, and as such includes not only the story of human events but the record so far as it can be known of political and economic movements, of the advancement of learning, the progress of religion, of law, of art, of literature, and of science. The sources of history are first the relics of those races of men which we call pre-historic. These consist chiefly of ornaments, weapons, utensils, and bones, many of them mere fragments, but from which many interesting facts have been gathered for the pages of history.

As a second source we have architectural monuments, such as buildings or parts of buildings, tombs, tablets of clay and of stone inscribed with dates and names, or events chronologically arranged. Sometimes these records have been found beneath beds of lava, or under ruins, or the dust of ages, and are written in unknown languages so that the work of the historian has been the severest sort of labor. The third source of history is written or printed records, and here, too, great difficulties are encountered, for many facts have been written like fiction, and still more often fiction has been written as fact, so that the historian must consider and compare, and weigh with nicety if he would present truth to his readers.

How long this earth has been the home of man no one can say. The geologist comes to the historian's aid at this point and tells us that 100,000 years is a conservative estimate. Civilization, that is continuous progression in civilization, is by no means as old. It is safe to say that in the valleys of the Nile and the Euphrates continuous civilization began about 7,000 years before Christ. Some few great events mark changes which seem like leaps or bounds in the slow march of human progress. The beginning of Christianity, the fall of Rome, the Crusades, the Reformation, the discovery of America, are such events. Occasionally, too, the name of some great man like Alexander the Great, Julius Caesar, or Charlemagne, shines forth like a light in the dimness and confusion of crowding scenes. Without such events to serve as milestones and such men to arouse our interest and enthusiasm, the study of history would seem well-nigh impossible.

That such study is an essential part of any general education is universally admitted. Stories from history are told the child in the kindergarten and often long before. By the time he reaches the seventh or eighth grade he is given a text-book of the history of his own country. In the high school he studies ancient history, including the histories of Greece and Rome and the Oriental nations up to 800 A. D.; and modern history, including the time from that date to the present. It is expected that the student get from this course a bird's-eye view, as it were, of the whole course of human history. Later, in college and university, special courses are offered covering the history of various nations, not only as a plain record but in the bearing that such history may have had on civilization as a whole. It is by knowing the past and judging it with discrimination and accuracy that a practical knowledge of the present, an ability to judge wisely of things as they are and as they may be, is gained. And in all this study, that it may do for us what it should, we must, as Emerson tells us, "see the necessary reason of every fact," see by the light of our own hearts and motives what stirred the hearts and prompted the deeds of those who have gone before. This is the key to the study of his-

tory, the thing that does away with that feeling of remoteness and unreality that sometimes makes history seem like dry bones. To quote Emerson again: "When a thought of Plato becomes a thought to me,—when a truth that fired the soul of Pindar fires mine, time is no more. When I feel that we two meet in a perception, that our two souls are tinged with the same hue, and do, as it were, run into one, why should I measure degrees of latitude, why should I count Egyptian years?"

See ROSETTA STONE; LAKE DWELLERS; ARUNDEL MARBLES.

Hitchcock, Edward (1793-1864), an American geologist. He was born at Deerfield, Massachusetts, May 24, 1793, and died at Amberst, February 27, 1864. He began life as principal of an academy, and was for a time pastor of the Congregational church at Conway. His taste for chemistry and natural history, and the writing of a popular work entitled *The Geology of the Connecticut Valley,* secured him a chair in Amherst College. In 1845 he was made president and also professor of natural theology and geology, rather a remarkable combination. In the United States, at least, geology was in its infancy. He had a rich field, and won distinction among European scientists. His study of fossil footprints in the sandstones of the Connecticut Valley was regarded as a piece of fine work. His geological work has been continued ably by his son Charles Henry Hitchcock, now professor of geology in Dartmouth College.

Hives, an eruption of the skin, due usually to some disturbance in the digestive tract. It is accompanied by severe itching. The eruption lasts in most cases for a few days only. In some cases it continues for several weeks and becomes very troublesome and difficult to cure. The treatment for hives is, of course, directed toward the digestive organs. A milk diet is recommended often. A tonic, or a change of air is also beneficial in many instances.

Hoang-Ho, ho-äng-hō′, the most northerly of the great rivers of China. The name signifies Yellow River. Its channel curves in wide loops several hundred miles in diameter, but, on the whole, its course is easterly. It empties into a gulf of the Yellow Sea. The Chinese Wall crosses it twice. In tables of rivers the length of the Hoang-Ho is given at 2,700 miles, and the area of its basin at 540,000 square miles. The lower valley of the Hoang-Ho is an immense delta built up by the river. The soil is alluvial, deep, and of unsurpassed fertility. It is said that this plain, which is about 700 miles long and from 150 to 500 miles in width, maintains a denser population than any other equivalent area of the earth's surface. The river is not particularly desirable for commerce. It is broad and shallow, and is apt to change its course with disastrous results both to commerce and agriculture. It is called China's Sorrow. Its lower course is connected with that of the Yang-tse-Kiang by the Grand Canal of China. See CHINA; GREAT WALL.

Hoar, George Frisbie (1826-1904), a distinguished American lawyer and legislator, an idealist who openly declared his sympathy for the Negro and the Indian, the Cuban and the Filipino. He was born at Concord, Mass., educated at Harvard University, entered upon a legal career, and soon became prominent in the Free Soil and the Republican parties. In 1852 Mr. Hoar was elected to the Massachusetts Legislature. From 1869 to 1877 he served four terms in the National House of Representatives, and subsequently served five terms in the United States Senate. Mr. Hoar deplored and opposed the annexation of territory by the United States; and though he supported President McKinley for reelection, Mr. Hoar was at variance with the President on his Philippine policy, declaring that it was contrary to American ideals. He received honorary degrees from various American universities, and for a time served as regent of the Smithsonian Institute and as president of the American Historical Association.

Hoarhound, a plant of the mint family. The common white hoarhound occurs native in Europe, northern Africa, and northern Asia. The square stems are covered with a hoary down, whence the popular name of the plant. The blossoms are sessile and crowded into a dense whorl

at the base of the leaf. When cut in bloom, the leaves are charged with a volatile, aromatic oil, known to the druggist as hoarhound. It is used in flavoring candy, and in medicine as a remedy for coughs and asthma. It is obtained from the leaves by distillation.

Hobart, an Australian seaport, and the capital of Tasmania, until 1881 was known as Hobart Town; it is situated at the foot of Mount Wellington, on the Derwent river. The city is built in the form of a square, the streets crossing each other at right angles. Among the public buildings are the government house, houses of Parliament, town hall, post office, museum, Episcopal and Roman Catholic cathedrals, a general hospital, and public and private schools.

There are many industrial plants here, such as jam factories, breweries, flour mills. tanneries, woolen factories, etc. Hobart has a deep harbor, easy of access and with good dock accommodation. Population, 1921, with suburbs, 52,163.

Hobbema, hŏb′bĕ-mä, **Meyndert** (1638-1709), a Dutch landscape painter. He lived at Amsterdam, and probably studied under Ruysdael, the master of the Dutch school of landscape. His pictures are famous for their restful beauty of woods and water, and for their rich coloring. Some of the best known are *The Water Mill, The Avenue Near Middelharnis,* and *The Ruins of Breberode Castle.* See RUYSDAEL.

Hobbes, Thomas (1588-1679), an English philosopher and writer. He was born in Wiltshire, of poor parents. His uncle, a rich glover, had him educated at Oxford. Though Hobbes wrote remarkable books on psychology and mathematics, he is best known as a philosopher and political scientist. His philosophy is that of a strict materialist; he held that nothing is spiritual, but everything material, even God, "the first cause of the universe." His well-known system of political economy declared that all men are natural enemies, and so the only way to prevent constant warfare is to yield all rights to a single will which is to decide every question. This was an argument for an absolute monarchy, and since Hobbes was tutor to Charles II, it is possible that his doctrines were colored by personal motives. He declared outright that the state was superior to the church, for the kingdom of Christ was not an earthly kingdom. He extended his doctrine of political economy to apply to men's relations to the church, declaring that whoever ventured to believe except as his sovereign recommended was guilty of a sin against God. Hobbes' style was vigorous and pleasing. His works are well worth careful study.

Hoboken, hō-bō′ken, a city of New Jersey. It is situated on the Hudson River north of Jersey City and opposite New York. It had a population in 1910 of 70,-324. It is the terminus of several railways. There are extensive wharves, coal yards, lumber yards, and other terminal facilities. The term *hobo,* applied to the genus of tramps, is said to be an abbreviation for Hoboken. It was applied by New Yorkers to the rough characters that were likely to collect in such a suburb. The name Hoboken, itself, is somewhat akin to the Western word pipestone. The Indians obtained stone in that vicinity for their tobacco pipes. Population, 1920, 68,166.

Hobson's Choice, a popular expression equivalent to "this or none." It is said to have originated in the custom of one Tobias Hobson, a carrier and the keeper of a livery stable at Cambridge, England, at the time Milton was a student. Probably with a view to treating his horses fairly, Hobson required his customers to take the horse that stood nearest the door—the first he came to. This eccentric character died in 1631. Milton wrote his epitaph. Hobson is described in the *Spectator,* No. 509.

Hockey, a game of ball played with bats having a curve or hook at the lower end. An ice pond, a green, or a large schoolyard is a suitable place for the game. Any number may play. The ball is placed at the center of the field. Players on each side strive to strike the ball and drive it over the goal line of their opponents. Any one who can reach the ball and find room to swing his stick may strike. The game is a favorite with school boys. It possesses the merit of bringing a large number into

active play all the time. The ball — a small block of wood answers quite as well —flies this way and that, and the entire field is in a hurly-burly. Of late the game has been taken up by English clubs and systematized after the manner of cricket and football. It is called also shinny, shinty, and hurly. See GOLF; POLO.

Hoe, Richard M. (1812-1886), the inventor of the rotary printing press. He was a native of New York City. His father also was a manufacturer and improver of printing presses. Richard Hoe was the first to conceive the plan of fastening the type from which a newspaper or book is printed to the exterior of a cylindrical iron drum. His predecessors, in improving the printing press, had the idea of wrapping the paper around a drum, but the type was always placed on a flat bed. The Hoe factories in New York City are the largest works of the kind in the world. See PRINTING PRESS.

Hofer, Andreas (1767-1810), a Tyrolese patriot who was court-martialed and shot by the French at Neontua. He was born at Saint Leonhard, and there became an innkeeper. In 1796 Hofer led a rifle company against the French at Lake Garda, and after the peace of Luneville organized the Tyrol militia. In 1809 he led the insurrection against the French and Bavarians which resulted in the liberation of the greater part of his country from the foreign yoke. Hofer was then put at the head of the civil and military administration until the Peace of Vienna was proclaimed. The French and Bavarians again invaded the Tyrol, and Hofer led his troops against them, but was betrayed to the French. The order for his execution was given by Napoleon.

Hofmann, Josef (1877-), a noted Polish pianist was born at Cracow. He first studied under his father, and at the age of six made his first public appearance. Attracting the attention of Rubinstein, young Hofmann studied with him for some time. He visited the United States in 1887-88 and began a concert tour, which through the intervention of the Society for the Prevention of Cruelty to Children he was forced to abandon. He returned to Europe, but did not again appear in public until 1894, when he played in Dresden. Hofmann has since made successful tours of Europe and America. He composed for the piano-forte, and is the author of two valuable handbooks — *Piano Playing* and *Piano Questions Answered*.

Hog, a domestic animal descended from the wild boar of Europe and Asia. The flesh of the hog is used universally as food, its hide is made into a good quality of leather, and the bristles are used to make brushes. The flesh, because of the quantities of salt it can absorb, is more extensively cured than is the flesh of any other animal. The Jewish and Mohammedan religions forbid the use of pork, stigmatizing the hog as an unclean animal. Yet the hog's fondness for mud baths is easily accounted for; the animal is a pachyderm, that is, it has a more than ordinarily thick skin, as have the hippopotamus and rhinoceros, and wet, cool mud plastered onto its hide furnishes about the only source of coolness of a constancy to insure penetration of the skin. Yet the filthy hog wallow is not essential to the animal's health; it thrives in clean sanitary surroundings as well as any other domestic animal, as hog raisers now know.

Hogs are more extensively bred in Europe and North America (especially the United States) than on the other continents. Some excellent breeds have been developed, so that one type produces an excess of lard while another will produce more bacon. The breeds that are best known are Yorkshire, Poland-China, Chester, Tamworth, Berkshire, Hampshire, Essex and Duroc. The great Mississippi Valley of the United States is the most important hog-raising area in the world; and Iowa is the principal hog-raising state in the United States. The census of the United States for 1920 gave 59,344,000 as the number of hogs, while the total number given for 1922 was somewhat less —56,996,000.

Hog cholera, disease of swine, has been known for about one hundred years, but the first authentic outbreak in this country occurred in Ohio in 1833. The losses in recent years have been enormous.

1. European wild boar and young.
2. Texas peccary.
3. African warthog.
4. Babiroussa of East India.

WILD HOGS.

The cause of the disease is a germ usually classified as a filterable virus, so small that it will pass the finest porcelain filters.

The symptoms of the disease are generally loss of appetite, desire for large quantities of water, due to high temperature, walking with a staggering gait, loss of flesh, sometimes diarrhea. Redness of the skin is often noticed, coughing is sometimes a symptom. Sometimes hogs will die suddenly with little if any warning. The same symptoms do not show in all cases.

No successful cure has been devised but a serum treatment has been developed by the Department of Agriculture which has proven effective in preventing the disease. A herd of hogs recently exposed to the disease may be treated with the serum which usually renders them proof against the disease. If a herd that has not been exposed to the disease is to be rendered permanently immune it must be treated with the virus of the disease as well as the serum.

The preparation of the serum is interesting. A hog of two hundred or three hundred pounds that has become immune by recovery from the disease or by having been given the double virus-serum treatment, is rendered doubly immune by injecting into its blood large quantities of the virus of the disease. In about ten days large quantities of the protective serum are developed in the hog's blood when it may be bled by cutting off the end of the hog's tail. The process may be repeated several times, depending on the length of the hog's tail; then the hog is killed and its blood caught and filtered. A three hundred pound hog will furnish enough of the serum to treat five hundred hogs of one hundred pounds each.

The serum is furnished by most state experiment stations to be administered by competent veterinarians.

The records of the Meat Inspection Division of the United States Department of Agriculture show that tuberculosis and cholera, in that order, are the diseases for which the greater number of hog carcases and parts have been condemned for several years. Veterinarians connected with this department have worked for a number of years to prevent cholera by teaching sanitation, by investigating and reporting outbreaks, and by spreading information on the administration of treatment to stricken animals. As a result, the per capita death rate among hogs is gradually decreasing.

Hogarth, hō′gärth, **William** (1697-1764), a celebrated London painter and engraver. His subjects were mainly the follies and vices of the great metropolis. *The Harlot's Progress* and *The Rake's Progress* were series of seven pictures each, depicting the downfall and bitter end of a young woman and of a young man respectively. A similar series, *Marriage à la Mode,* satirizes the follies of high life. These pictures and many others, as *The Sleeping Congregation* and *The Election of a Member of Parliament,* had a wide circulation as volumes of engravings, and were influential in reforming London society. See CARICATURE.

Hogg, James (1772-1835), a Scottish poet. He was born in the Ettrick Forest in Selkirkshire. He attended the parish school. He was bred a shepherd. His first song appeared anonymously. In the summer of 1801 Scott visited the Ettrick Forest in search of material for *Border Minstrelsy.* The inhabitants directed him to Hogg as a man of poetic acquirements. Hogg interested himself in taking down ballads from the lips of the old inhabitants. Many of these appeared in Scott's forthcoming volume. This acquaintance with Scotland's greatest man of letters proved a stimulus to Hogg. He wrote with regularity, signing himself "The Ettrick Shepherd." He made various attempts to manage a farm for himself, but each time succeeded in losing whatever money he had secured from his publications. His most celebrated production is the *Queen's Wake.* He wrote a number of prose volumes, including *The Brownie of Bodsbeck, Winter Evening Tales, Song Sermons,* etc. Chambers is authority for the statement, that "After Burns, Hogg is unquestionably the greatest peasant poet which Scotland has produced."

Hogmanay, hŏg-ma-nā′, the last day and evening of the old year. At this season the country people and young folks of north England and the Lowlands of

Scotland were wont to go from door to door calling out "Hogmanay." They expected to be welcomed with small presents. The greeting seems to carry the meaning of "Christmas gift" and "Happy New Year" combined. The custom is thought to owe its origin to an ancient Druid cry or phrase of greeting, meaning "To the Mistletoe, the New Year."

> The cottar weanies, glad and gay,
> Wi' pocks out owre their shoulder,
> Sing at the doors for hogmanay.

See HOLIDAY; NEW YEAR'S DAY.

Hohenlinden, hō-en-lĭn'den, literally Linden heights, a Bavarian village nineteen miles east of Munich. It is noted as the scene of a battle fought December 3, 1800. The French general, Moreau, defeated the Austrians under Archduke John. Eight thousand Austrians fell on the field of battle and 12,000 were taken prisoners. Schoolboys will recall the English poet, Campbell's, stirring lyric beginning:

> On Linden when the sun was low
> All bloodless lay the untrodden snow, etc.

Hohenzollern, ho-en-tsol'lern, the recent ruling family of Prussia. The family sprang from a tiny province of that name. The curious may find it on the map of Germany sandwiched in between Wurtemberg and Baden, about fifty miles north of Lake Constance. The old family castle was formerly a fortification of great strength. In 1415 a young member of the family was made elector of Brandenburg, not, at that time, a particularly enviable position on the Baltic. He and his successors created the kingdom of Prussia. Finally the younger branch became the head of the house, and the old home became an outlying province of Prussia. Frederick the Great was a Hohenzollern.

Holbein, hol'bīn, **Hans** (1497-1543), a celebrated German painter. He was born in Augsburg and died in London. He is best known by a copy of the Meyer *Madonna* in the Dresden Gallery. It is an interesting fact that no painter of note ever ventured to paint a madonna as a Hebrew woman or the Christ child as a Hebrew boy. The Italian painters followed Italian types of beauty; the Spaniards, Spanish types; and so on to the end of the list. Holbein is no exception. The madonna of this picture is the golden-haired wife of the wealthy burgomaster of Basle, and the other personages are but the burgomaster's family circle. National pride has insisted that this picture is a rival of the *Sistine Madonna,* but it is difficult to see merit in the claim. Holbein was educated by his father for whom he was named and who was himself a painter of no mean repute. Hans, the younger, painted many London celebrities, including Lady Jane Seymour and Henry VIII. Much of his work was destroyed by the Puritans. Much of it was destroyed in the great London fire of 1666. See PAINTING.

Holden, Edward Singleton (1846-1914), an eminent American astronomer who during his ten years as director of the Lick Observatory at San Jose, Calif., rendered valuable service to astronomical science. He was born at St. Louis, Mo., and graduated from Washington University in his native city, and from the United States Military Academy. From 1873 to 1881 Dr. Holden was professor of mathematics at the United States Naval Academy, and from 1881-85, director of the Washburn Observatory at Madison, Wis. For two years he was president of the University of California, and in 1888 began his service at the Lick Observatory, designing almost all the buildings and instruments used there. From 1901 until his death Dr. Holden was librarian of the United States Military Academy. He is the author of *Essays in Astronomy, Elementary Astronomy, Mountain Observatories* and *Index Catalog of Nebulae.*

Holidays, literally holy days, days on which ordinary occupations are suspended. We speak of New Year's Day, the Fourth of July, Thanksgiving Day, and the twenty-fifth of December or Christmas Day, as national holidays, but, as a matter of fact, Congress authorizes their observance only in the District of Columbia and territories. It has designated the second Sunday in May as Mothers' Day. President Wilson issued a proclamation May 30, 1916, requesting that June 14, the anniversary of the day on which the national

emblem was adopted by Congress, be observed as Flag Day throughout the nation. Save by custom we have no national holidays. The laws of the various states are far from uniform. There are no statutory holidays in Mississippi, but by common consent the Fourth of July, Thanksgiving, and Christmas are observed.

The following table of legal holidays in the various states has been brought down to 1923:

GENERALLY OR LOCALLY OBSERVED.

Arbor Day—Usually fixed by governor
Armistice Day—Nov. 11.
Bennington Battle Day—Aug. 16.
Child Labor Day—Last Sunday in January.
Christmas Day—Dec. 25.
Columbus Day—Oct. 12.
Confederate Memorial Day—See MEMORIAL DAY.
Davis, Jefferson, Birthday—June 3.
Decoration Day—See MEMORIAL DAY.
Election Days.
Fire Prevention Day—Oct. 9.
Flag Day—June 14.
Georgia Day—Feb. 12.
Independence Day—July 4
Indian Day—Fourth Friday in September.
Jefferson's Birthday—April 13.
Labor Day—First Monday in September.
Landing Day—July 25 (Porto Rico).
Lee's Birthday—Jan. 19.
Lincoln's Birthday—Feb. 12.
Maine (Battle Ship) Day—Feb. 15.
Mardi Gras—February (New Orleans).
McKinley Day—Jan. 29.
Mecklenburg Independence Declaration—May 20.
Memorial Day—Federal, May 80; Confederate, April 26 (Alabama, Georgia, Florida, Mississippi) and May 10 (North and South Carolina.)
Mothers' Day—Second Sunday in May.
New Orleans, Battle of—Jan. 8.
New Year's Day—Jan. 1.
Patriots' Day—April 19 (Maine, Massachusetts).
Pioneers' Day—July 15 (Idaho), July 24 (Utah).
Texas Independence Day—March 2.
Thanksgiving Day—Last Thursday in November.
Washington's Birthday—Feb. 22.

HOLIDAYS IN THE VARIOUS STATES.

Alabama—Jan. 1; Jan. 19 (Lee's birthday); Feb. 22; Mardi Gras (the day before Ash Wednesday, first day of Lent); Good Friday (the Friday before Easter); April 26 (Confederate Memorial day); June 3 (Jefferson Davis' birthday); July 4; Labor day (first Monday in September); Thanksgiving day (last Thursday in November); Dec. 25.

Alaska—Jan. 1; Feb. 22; May 30 (Memorial day); July 4; Thanksgiving day; Dec. 25.

Arizona—Jan. 1; Arbor day (first Monday in February); Feb. 22; May 30; July 4; general election day; Thanksgiving day; Dec. 25.

Arkansas—Jan. 1; Feb. 22; July 4; Thanksgiving day; Oct. 12 (Columbus Day); Dec. 25.

California—Jan 1; Feb. 22; May 30; July 4; Sept. 9 (Admission day); Labor day (first Monday in September); Oct. 12; general election day in November; Thanksgiving day; Dec. 25.

Colorado—Jan. 1; Feb. 22; Arbor and School day (third Friday in April); May 30; July 4; first Monday in September; general election day; Oct. 12; Thanksgiving day; Dec. 25; every Saturday afternoon from June 1 to Aug. 31 in the city of Denver.

Connecticut—Jan. 1; Feb. 12 (Lincoln's birthday); Feb. 22; Good Friday; May 30; July 4; Labor day (first Monday in September); Thanksgiving day; Dec 25.

Delaware—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; first Monday in September; Oct. 12; Thanksgiving day; Dec. 25.

District of Columbia—Jan. 1; Feb. 22; March 4 (Inauguration day); May 30; July 4; first Monday in September; Thanksgiving day; Dec. 25.

Florida—Jan. 1; Jan. 19 (Lee's birthday); Arbor day (first Friday in February); Feb. 22; April 26 (Confederate Memorial day); June 3 (Jefferson Davis' birthday); July 4; first Monday in September; Thanksgiving day; general election day; Dec. 25.

Georgia—Jan. 1; Jan. 19 (Lee's birthday); Feb. 22; April 26 (Confederate Memorial day); June 3 (Jefferson Davis' birthday); July 4; first Monday in September; Thanksgiving day; Arbor day (first Friday in December); Dec. 25.

Idaho—Jan. 1; Feb. 22; Arbor day (first Friday after May 1); July 4; first Monday in September; Oct. 12; general election day; Thanksgiving day; Dec. 25.

Illinois—Jan. 1; Feb. 12 (Lincoln's birthday); Feb. 22; May 30; July 4; Labor day (first Monday in September); Indian day (fourth Friday in September); Oct. 12 (Columbus day); election days when members of the legislature are chosen; Saturday afternoons; Armistice day, Nov. 11; Thanksgiving day; Dec. 25; Arbor, Bird, Flag and Mothers' days are appointed by the governor, but are not legal holidays.

Indiana—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; first Monday in September; Oct. 12; general election day; Thanksgiving day; Dec. 25.

Iowa—Jan. 1; Feb. 22; May 30; July 4; first Monday in September; general election day; Thanksgiving day; Dec. 25.

Kansas—The only holidays by statute are Feb. 12; Feb. 22; May 30; Labor day (first Monday in September); and Arbor day Oct. 12; but the days commonly observed in other states are holidays by general consent.

Kentucky—Jan. 1; Feb. 22; May 30; first Monday in September; Oct. 12; Thanksgiving day; general election day; Dec. 25.

Louisiana—Jan. 1; Jan. 8 (anniversary of the battle of New Orleans); Feb. 22; Mardi Gras (day before Ash Wednesday); Good Friday (Friday before Easter); April 26 (Confederate Memorial day); July 4; Nov. 1 (All Saints day); general election day; fourth Saturday in November (Labor day in the parish of New Orleans only); Dec. 25; every Saturday afternoon in New Orleans.

Maine—Jan. 1; Feb. 22; Good Friday; May 30; July 4; Labor day; Thanksgiving day; Dec. 25.

Maryland—Jan. 1; Feb. 22; May 30; July 4; first Monday in September; Sept. 12 (Defenders' day); Oct. 12; general election day; Dec. 25; every Saturday afternoon.

Massachusetts—Jan. 1; Feb. 22; April 19 (Patriot's day); May 30; July 4; first Monday in September; Oct. 12; Thanksgiving day; Dec. 25.

Michigan—Jan. 1; Feb. 22; Oct 12; general election day; May 30; July 4; first Monday in September; Thanksgiving day; Dec. 25.

Minnesota—Jan. 1; Feb. 12; Feb. 22; Good Friday (Friday before Easter); May 30; July 4; first Monday in September; Thanksgiving day; general election day; Dec. 25; Arbor day (as appointed by the governor).

Mississippi—First Monday in September; by common consent July 4, Thanksgiving day and Dec. 25 are observed as holidays.

Missouri—Jan. 1; Feb. 22; May 30; July 4; Labor day; Oct. 12; general election day; Thanksgiving day; Dec. 25; every Saturday afternoon in cities of 100,000 or more inhabitants.

Montana—Jan. 1; Feb. 22; Arbor day (third Tuesday in April); May 30; July 4; first Monday in September; Oct. 12; general election day; Thanksgiving day; Dec. 25; any day appointed by the governor as a fast day.

Nebraska—Jan. 1; Feb. 22; Arbor day (April 22); May 30; July 4; first Monday in September; Thanksgiving day; Dec. 25.

Nevada—Jan. 1; Feb. 22; July 4; Thanksgiving day; Dec. 25.

New Hampshire—Feb. 22; fast day appointed by the governor; May 30; July 4; first Monday in September; Thanksgiving day; general election day; Dec. 25.

New Jersey—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; first Monday in September; Oct. 12; general election day; Thanksgiving and fast days, and every Saturday afternoon.

New Mexico—Jan. 1; July 4; Thanksgiving and fast days; Dec. 25; Memorial, Labor and Arbor days appointed by the governor.

New York—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; first Monday in September; Oct. 12; general election day; Thanksgiving and fast days; Dec. 25; every Saturday afternoon.

North Carolina—Jan. 1; Jan. 19 (Lee's birthday); May 10 (Confederate Memorial day); May 20 (anniversary of the signing of the Mecklenburg declaration of independence); July 4; state election day in August; first Thursday in September (Labor day) Thanksgiving day; Dec. 25; every Saturday afternoon.

North Dakota—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Arbor day (when appointed by the governor); general election day; Thanksgiving day; Dec. 25.

Ohio—Jan. 1; Feb. 22; May 30; July 4; first Monday in September; Oct. 12; general election day; Thanksgiving day; Dec. 25; every Saturday afternoon in cities of 50,000 or more inhabitants.

Oklahoma—Jan. 1; Feb. 22; May 30; July 4; Oct. 12; general election day; Thanksgiving day; Dec. 25.

Oregon—Jan. 1; Feb. 22; May 30; first Saturday in June; July 4; first Monday in September; general election day; Thanksgiving day; public fast days; Dec. 25.

Pennsylvania—Jan. 1; Feb. 12; Feb. 22; May 30; Good Friday; July 4; first Monday in September; Oct 12; general election day; Thanksgiving day; Dec. 25; every Saturday afternoon.

Philippines—Jan. 1; Feb. 22; Thursday and Friday of Holy week; July 4; Aug. 13; Thanksgiving day; Dec. 25; Dec. 30.

Porto Rico—Jan. 1; Feb. 22; Good Friday; May 30; July 4; July 25 (Landing day); Thanksgiving day; Dec 25.

Rhode Island—Jan. 1; Feb. 22; second Friday in May (Arbor day); May 30; July 4; first Monday in September; Oct. 12; general election day; Thanksgiving day; Dec. 25.

South Carolina—Jan. 1; Jan. 19 (Lee's birthday); Feb. 22; May 10 (Confederate Memorial day); June 3 (Jefferson Davis' birthday); general election day; Thanksgiving day; Dec. 25, 26, 27.

South Dakota—Same as in North Dakota.

Tennessee—Jan. 1; Good Friday; May 30; July 4; first Monday in September; general election day; Thanksgiving day; Dec. 25; every Saturday afternoon.

Texas—Jan. 1; Feb. 22 (Arbor day); March 2 (anniversary of Texas independence); April 21 (anniversary of battle of San Jacinto); July 4; first Monday in September; Oct. 12; general election day; appointed fast days; Thanksgiving; Dec. 25.

Utah—Jan. 1; Feb. 22; April 15 (Arbor day); May 30; July 4; July 24 (Pioneer day); first Monday in September; Thanksgiving day and appointed fast days; Dec. 25.

Vermont—Jan. 1; Feb. 22; May 30; July 4; Aug. 16 (Bennington Battle day); Labor day; Oct. 12; Thanksgiving day; Dec. 25.

Virginia—Jan. 1; Jan. 19 (Lee's birthday); Feb. 22; July 4; first Monday in September; Thanksgiving and appointed fast days; Dec. 25; every Saturday afternoon.
Washington—Jan. 1; Feb. 12 (Lincoln's birthday); Feb. 22; May 30; July 4; first Monday in September; Oct. 12; general election day; Thanksgiving day; Dec. 25.
West Virginia—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; general election day; Thanksgiving day; Dec. 25.
Wisconsin—Jan. 1; Feb. 22; May 30; July 4; first Monday in September; general election day; Thanksgiving day; Dec. 25.
Wyoming—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; first Monday in September; general election day; Dec 25.

HOLIDAYS IN CANADA. The following holidays are generally observed in the Dominion of Canada with the closing of banks and public offices and the cessation of business: Jan. 1; Ash Wednesday; Good Friday, Easter Monday, Whit Monday, May 24 (Empire day), June 3 (King's birthday), July 1 (Dominion day), first Monday in September (Labor day), Dec. 25 (Christmas day). The Monday of the week in November in which Armistice day falls (Nov. 11th) is now proclaimed as Thanksgiving Day.

FOREIGN INDEPENDENCE DAYS. Argentina, May 25; Armenia, May 28; Baltic states, Nov. 18; Bolivia, Aug. 6; Brazil, Sept. 7; Bulgaria, Oct. 5; China, Oct. 10 (anniversary of revolution); Colombia, July 20; Costa Rica, Sept. 15; Czecho-Slovakia, Oct. 28; Ecuador, Aug. 10; Finland, Dec. 6; France, July 14 (Bastille day); Germany, Nov. 9 (anniversary of republic); Greece, April 7; Guatemala, Sept. 15; Haiti, Jan. 1; Honduras, Sept. 15; Liberia, July 26; Mexico, Sept. 16; Nicaragua, Sept. 15; Norway, May 17; Panama, Nov. 28; Paraguay, May 14 and 15; Peru, July 28-30; Poland, May 3 (Constitutional day); Portugal, Dec. 1; Salvador, Sept. 15; Uruguay, Feb. 28; Venezuela, July 4.

See ARBOR DAY; NEW YEAR'S DAY; CHRISTMAS; THANKSGIVING; MARDI GRAS.

Holinshed, hŏl'ĭnz-hĕd, **Raphael,** an English chronicler of the sixteenth century. The exact dates of his life are unknown, but he died about 1580. Early in Elizabeth's reign he began work as a translator for a London printer named Reginald Wolfe, and it was for this printer that he began his great work, an original compilation, entitled *Chronicles of England, Scotland, and Ireland.* This work is mentioned frequently as the "Shakespeare Edition" of Holinshed, because Shakespeare used it for his historical plays.

Holland. See NETHERLANDS.

Holland, or **Hollands,** plain-woven linen cloth. Holland was at one time especially noted for its linens. Moreover, linen cloth from all over Europe was sent to Holland to be bleached. In this way, the custom arose of calling linen, especially of a fine quality, Holland linen or Hollands. At present the name usually designates unbleached or partly bleached linen. It is sometimes called brown linen. Window holland, or holland shade cloth, is a fabric used exclusively for window shades.

Holland, John Philip (1824-1914), an Irish-American inventor who did more than any other man to prove the practicability of submarine navigation. He was born in County Clare, Ireland, and educated in Limerick. For fifteen years Mr. Holland taught school in Ireland and in America. It is said that he bore an intense hatred toward England, and that he conceived of the submarine boat as a means of destroying her sea power. However this may be, he built and launched a small boat in 1875, and a second in 1877. In 1881 the third appeared. The last Holland boat was put to a severe test, and in 1900 was ordered by the United States government. In 1903 eight of the submarines were launched, and the modern undersea boats of almost all nations are built upon Holland's plan. Mr. Holland experimented in aeronautics, but with no success, and died in poverty.

Holland, Josiah Gilbert (1819-1881), an American author and journalist. An English recipe for a brilliant man runs, "Give him parts and poverty." J. G. Holland had both, but he was neither a genius nor a pauper. Of New England ancestry and educated for medicine, he began practice in Springfield, Massachusetts, but he kept writing for papers until he was invited to become assistant editor of the *Springfield Republican* at forty dollars per month. Two years later a friend loaned him money to buy a third interest in the paper. Holland's first success was a series of sketches of towns in western Massachusetts. *Timothy Titcomb's Letters* on moral topics pleased the plain people. As some one says, while the New England co-

terie of great thinkers was writing in the *Dial* of the "Whichness of the What," Holland was telling Yankee farmers that they ought to provide their wives with something better to burn than green wood. After they had run in the *Republican* Charles Scribner brought out the *Titcomb Letters* in book form. The book met with immediate success. *Gold Foil, Plain Talks on Familiar Subjects,* the novels, *Arthur Bonnicastle, Nicholas Minturn, Seven Oaks,* and the narrative poems, *Katrina* and *Bitter-Sweet,* were all popular during their author's lifetime. Although less widely read since that time they are still favorites with many. They are all characterized by a natural and vivacious style, by a wholesome moral tone, and by great good sense. In 1867 Holland closed his connection with the *Republican* and went abroad. In Geneva he fell in with a former American acquaintance, a Mr. Roswell Smith. Standing on the bridge that spans the Rhone as it shoots like an arrow out of Lake Geneva, they discussed the founding of a new magazine of which Dr. Holland should be editor and Mr. Smith, manager. Returning to this country, they arranged with Mr. Charles Scribner for the publication of *Scribner's Monthly,* which Holland continued to edit for eleven years. October 11, 1881, he sat in the editorial office of *Scribner's* writing an article on Garfield's death for the November issue. The last written words of the article are, "his sympathy with the humble drew to him the hearts of the world." At six the next morning, Holland, never a strong man, was dead. He was buried at Springfield in sight of Mt. Holyoke. Washington Gladden wrote:

Mountain that watchest down the vale
Most like a couchant lion—
Wide, winding river, whose fair breast
Soft south winds gently die on—
Lift up the head; flow still and slow;
Let no chill blast now chide you;
For one who loved you long ago
Lies down to sleep beside you.

God give us men! A time like this demands
Strong minds, great hearts, true faith and ready hands;
Men whom the lust of office does not kill;
Men whom the spoils of office cannot buy;
Men who possess opinions and a will;
Men who have honor, men who will not lie;
Men who can stand before a demagogue
And damn his treacherous flatteries without winking!
Tall men, sun-crowned, who live above the fog
In public duty and in private thinking:
For while the rabble, with their thumb-worn creeds,
Their large professions and their little deeds,
Mingle in selfish strife—lo! Freedom weeps,
Wrong rules the land, and waiting Justice sleeps!
—*Wanted.*

Holland, Mich., an industrial city, is situated on an arm of Lake Michigan called Black Lake, 25 miles southwest of Grand Rapids. It is on the Pere Marquette Railroad, and is directly connected by boat with Chicago, Milwaukee and other lake ports. This city was founded in 1847 by a colony of Dutch, and a large part of its present inhabitants are of Dutch descent. Although the city has attained some popularity as a summer resort, it is interested chiefly in the manufacture of lumber, furniture, tubs, baskets and woodworking machinery. It is also a center for the manufacture of beet sugar and launches. It contains Hope College, the Western Theological Seminary, a public library, good schools and two parks. The water works and electric light plant are municipally owned. Population in 1920, 12,183.

Holley, Marietta (1844-), an American author better known by her pseudonym of Josiah Allen's Wife. She was born in Jefferson County, New York. Her first literary work was in the form of contributions to the *Christian Union, Independent, Peterson's Magazine,* and other periodicals. Her first book was, *My Opinions and Betsy Bobbet's.* This was followed by *Samantha at the Centennial, My Wayward Pardner, Sweet Cicely, Samantha at Saratoga, Samantha among the Brethren, Samantha at the World's Fair.* Miss Holley's writings have been immensely popular. They are of a humorous character, but "Samantha" is, after all, characterized by great good sense.

Holly, ornamental shrubs with evergreen or with falling leaves. There are not far from 175 species, represented in each of the grand divisions. The leaves of a South American species are used by the people of

Paraguay for tea (maté). English holly makes a strong hedge and is the finest shrub in the world for decorative purposes. In his introduction to Canto Sixth of *Marmion,* Scott says:

> On Christmas Eve the bells were rung. . . .
> The damsel donned her kirtle sheen,
> The hall was dressed with holly green.

It has been suggested that holly is from holy, being dedicated to festivities. American holly is a southern tree, growing up to fifty feet in height. Its evergreen leaves are oval with waxy margins and spiny teeth. The scarlet berries are about the size of small peas. We have inherited the use of Christmas holly. Delaware and Maryland supply the eastern trade. Western holly, packed in crates, comes from Tennessee and Mississippi by the car load. See CHRISTMAS.

Hollyhock, a fine old garden flower allied to the marsh mallow. A native of China. It is to be regretted that flower gardens do not keep up the old showing of brave, erect, magnificent hollyhocks. Seed planted in the spring produces plants that bloom the second season. All that hollyhocks require, once well rooted in a rich corner, is a little protection with light litter in winter. The large, rough, heart-shaped leaves have character. The large, open sessile flowers begin to appear in July and soon form a tall spike gorgeous in crimson, rose, yellow, white, or lavender. The hollyhock is the most stately plant in the flower garden. It may be grown either from seed or cuttings. The hollyhock is often attacked by a fungus, which has hindered its growth to a great degree in the United States. The presence of the fungus may be observed in May or June by small yellow spots which appear on the leaves and stems. The leaves soon become dry and look as if scorched. If some good fungicide is applied often from early spring until the time for flowering arrives, the disease may be checked. See MALLOW.

Holmes, Joseph Austin (1859-), an American geologist, was born at Laurens, S. C. Graduating from Cornell University, he was appointed professor of geology and natural history at the University of North Carolina, holding this position from 1881 to 1891. From 1891 to 1904 he was State geologist of North Carolina; from 1904 to 1907 he had charge of the United States Geological Survey laboratories for testing fuels and structural materials at St. Louis, Mo., and after 1908 at Pittsburgh, Pa. From 1907 to 1910 Mr. Holmes investigated mine accidents for the government, and when the Bureau of Mines was organized in 1910 under the Department of the Interior he became its director. He was chief of the department of mines and metallurgy at the St. Louis Exposition. He has written and published works on mining technology, safe and efficient methods of mining, mine explosions, etc.

Holmes, Oliver Wendell (1841-), an American jurist and Associate Justice of the United States Supreme Court, son of Dr. Oliver Wendell Holmes, Sr., was born in Boston, educated at Harvard, and served in the Civil War in the battles of Ball's Bluff, Antietam, and Fredericksburg. He studied law, was admitted to the bar in Boston, and from 1870 to 1873 was editor of the *American Law Review.* In 1882 he became professor of law at Harvard, in the same year being appointed a member of the Massachusetts Supreme Court, becoming Chief Justice in 1899. In 1902 he succeeded Justice Gray in the United States Supreme Court, where he attained high rank owing to his profound knowledge of law, his fluency of expression, sound judgment and humor.

Justice Holmes has written several books on law, among which are: a volume of speeches, *The Common Law,* a compilation of lectures given at Lowell Institute. He is also the editor of the twelfth edition of *Kent's Commentaries.* On the occasion of his seventy-sixth birthday, he was the oldest member of the Supreme Court, and with the exception of Chief Justice White, the oldest in point of membership.

Holmes, homz, **Oliver Wendell** (1809-1894), an American man of letters. He was born in Cambridge, August 29, 1809, and died in Boston, October 8, 1894. His father was the Reverend Abiel Holmes; his mother was a Wendell of Dutch descent. Through her he was related to the orator, Wendell Phillips, and other people of note.

He was graduated at Harvard in 1829. His class included more than its share of noted names. At Harvard young Holmes was noted for his waggish contributions to the college paper. The year after his graduation a report came out that the government intended to dismantle the frigate Constitution and to sell it for old iron. Holmes burst into print with an indignant poem named *Old Ironsides,* one of his best efforts. The poem prevented the destruction of the frigate, and it is still preserved in the navy yard at Boston, an object of interest to all visitors.

Of excellent family, with abundant means, and a favorite in society, Holmes was uncertain for a time what to do with himself. He toyed with law for a year, then abandoned it for the study of medicine. He went abroad for several years, studying chiefly at the University of Paris, but making side trips into England, Germany, and Italy. He finally took his degree at the Harvard Medical School in 1836. About this time he published a small volume of verse, including such poems as *My Aunt* and *The Last Leaf.* He now entered upon the practice of medicine, but had few patients. He humorously stated "that the smallest fevers would be thankfully received." In 1839 he received an appointment as a professor of anatomy and physiology at Dartmouth College, a position which he held for a year. He then returned to Boston and took up the practice of medicine. In 1841 he accepted a similar professorship at Harvard, a position which he filled with eminent success until his retirement in 1882. Though his practice had never been extensive, he was made dean of the department of medicine and was regarded as a most acceptable lecturer. Sprightly, witty, and sound, he was ever alert. Students were seldom too weary or listless to hear him with attention. He wrote a series of three novels, *Elsie Venner, The Guardian Angel,* and *A Mortal Antipathy,* which bear the stamp of his medical researches. The three constitute a study in heredity, but they do not hold high rank as novels. The interest in them arises from the fact that they were written by so eminent a man as Dr. Holmes.

Leaving Holmes, the lecturer, for Holmes, the essayist and poet, it may be said that he owed much to Lowell, who recognized his rare genius. In 1857 the latter consented to accept the editorship of the *Atlantic Monthly* on the express condition that Holmes write for its columns. Holmes' first contribution was a series of delightful table chats known as *The Autocrat of the Breakfast Table.* It is his most characteristic work and his best. .It is not too much to say that nothing of the sort in print equals the *Autocrat.* A similar series, called *The Professor,* and a third, known as *The Poet,* followed in due order. A fourth volume appeared in 1890. This Dr. Holmes considered the child of his old age. He facetiously dubbed it *Over the Teacups.* Like its predecessors, it is chatty and bright, for Holmes never grew old. It was a standing jest that Dr. Holmes was eighty years young. *Our Hundred Days in Europe,* published in 1887, is an account of a trip taken in that year, and closes the list of his essay work. All his essays manifest a kindly, tolerant spirit.

Dr. Holmes' poems fill three of thirteen volumes in the standard edition of his published works. *The Chambered Nautilus* is, all in all, his greatest poem. *Contentment* was written in a playful vein. Among his longer poems are *The Deacon's Masterpiece, or The Wonderful One Hoss Shay, The Broomstick Train,* and *How the Old Horse Won the Bet.* Nothing else just like them has been written on either side of the Atlantic.

Holmes was much in demand as an after-dinner poet. On the occasion of festivals, club dinners, centennial celebrations, college reunions, dedications, and the like, a program was not considered complete without a poem from Dr. Holmes. Nearly a half of his poems, much of his best work, was written for occasions of this sort. *The Boys, For Burns' Centennial, At the Atlanta Dinner, Verses for After Dinner, Once More, For Whittier's Seventieth Birthday, At the Saturday Club, The Old Cruiser,* and *The Last Survivor* are characteristic occasional poems written for after-dinner programs.

Inasmuch as Holmes' poems are quoted more frequently than his prose, room is made here for a paragraph from *The Pro-*

fessor, in which the poet-lecturer flays the quacks of his profession:

"Here, look at medicine. Big wigs, gold-headed canes, Latin prescriptions, shops full of abominations, recipes a yard long, 'curing' patients by drugging, as sailors bring a wind by whistling, telling lies at a guinea apiece—a routine, in short, of giving unfortunate sick people a mess of things either too odious to swallow or too acrid to hold, or, if that were possible, both at once. You don't know what I mean, indignant and not unintelligent country practitioner? Then you don't know the history of medicine—and that is not my fault."

Stanzas from the *Nautilus* and the *Katydid* are quoted under those topics. Other passages are found under GULL; FLOUNDER. See also AUTOCRAT OF THE BREAKFAST TABLE; OLD IRONSIDES.

SAYINGS.

The last leaf upon the tree.

Our brains are seventy-year clocks. The Angel of Life winds them up once for all, then closes the case and gives the key into the hands of the Angel of Resurrection.

I was just going to say when I was interrupted.

Stick to your aim: the mongrel's hold will slip,
But only crowbars loose the bull-dog's grip.

There are but two biographers who can tell the story of a man's life. One is the person himself; the other is the Recording Angel. The autobiographer cannot be trusted to tell the whole truth, though he may tell nothing but the truth; and the Recording Angel never lets his book go out of his own hands.

Wealth is a steep hill, which the father climbs slowly and the son often tumbles down precipitately; but there is a tableland continuous with it, which may be found by those who do not lose their head in looking down from its sharply cloven summit.

I would have a woman as true as death. At the first real lie which works from the heart outward, she should be tenderly chloroformed into a better world, where she can have an angel for a governess, and feed on strange fruits, which shall make her all over again, even to her bones and marrow.

She who nips off the end of a brittle courtesy, as one breaks the tip of an icicle, to bestow upon those whom she ought cordially and kindly to recognize, proclaims the fact that she comes not merely of low blood, but of bad blood.

God bless all good women! To their soft hands and pitying hearts we must all come at last!

Fame usually comes to those who are thinking about something else; rarely to those who say to themselves, "Go to, now! let us be a celebrated individual."

TRIBUTES TO HOLMES.

A critic who punctured vice and folly with a lancet so smooth and keen it scarce inflicts any pain.—C. A. Bartol.

Holmes loves fact, yet often salutes with awe the superior angel of imagination. . . . Heaven send us on this side of the Atlantic a teacher so wise and generous, so witty, so tender, and so true!—H. R. Haweis.

I am confident that no writer since Walter Scott has given so much pleasure to so many English-speaking people as he.—Judge Hoar.

A kindlier philosopher never made fun for himself or his fellows.—*The Westminster Gazette.*

He has become a patriarch of our literature, and all his countrymen are his lovers.—George William Curtis.

A preacher all his life of the most serious gospel of duty and fidelity.—George Willis Cooke.

He is a Montaigne and Bacon under one hat. His varied qualities would suffice for the mental furnishing of half a dozen literary specialists.—John G. Whittier.

As a professional man, he has been thorough and successful; as a man of letters, versatile, brilliant, of the highest culture; as a citizen, patriotic; as a man, an exemplification of elegance of manner and kindliness of heart.—Arthur Gilman.

It may be said truly of Holmes, as Coleridge said of Goldsmith, "He did everything happily."—F. H. Hedge.

The rollicking laugh of Knickerbocker was a solitary sound in the American ear till the blithe carol of Holmes returned a kindred echo.—Curtis.

By his life of spotless purity and transparent sincerity he has crowned the literary life of New England with a diadem of imperishable lustre.—Rev. Walter Calley.

There's Holmes, who is matchless among you for wit;
A Leyden-jar always full-charged from which flit
The electrical tinges of hit after hit;
. . . . . .
His are just the fine hands, too, to weave you a lyric,
Full of fancy, fun, feeling, or spiced with satyric,
In a measure so kindly, you doubt if the toes
That are trodden upon are your own or your foes'. —J. R. Lowell.

Holmes, then, was a humorist, and no study of American humor can omit his name. His fun was that of the fine gentleman and appealed equally to the head and the heart. He had wit, that intellectual quality which sees incongruities and expresses them in such apt terms of language that a keen mental delight follows; but quite as truly, he had that atmospheric quality of humor which rests upon kindliness, exhibits temperament, and is so close akin to pathos that often the two blend, as does an April day of sun and shower. . . . Dr. Holmes's greatest ambition was to be a poet; yet his achievements in prose, on the whole, outweigh what he did in verse. Familiar and well loved as are certain of his lyrics, he will be longest remembered as an essayist.—Richard Burton.

Holstein, hōl'stīn, an ancient duchy of Denmark. In 1866 it was wrested from the Danes and combined with Schleswig to form a province of Prussia. It is a famous dairy district. The celebrated black and white Holstein cattle originated here.

Holy Alliance, The, a league formed by the sovereigns of Russia, Austria, and Prussia soon after the downfall of Napoleon. The name by which the league is known belongs properly to an agreement entered into at Paris a month or two earlier. This earlier league was proposed by the Czar, possibly in much such a fit of religious exaltation as led his successor in the twentieth century to propose a peace conference at The Hague. Coming back to the political league, a formal document was signed September 26, 1815. The professed purpose was to unite sovereigns in a holy brotherhood. Signers agreed to govern their peoples as "branches of one Christian nation, following the precepts of justice, charity, and peace." The agreement was signed by all the rulers of Europe, save the pope and the king of Great Britain and Ireland. The real purpose was to perpetuate the reigning families and resist republican tendencies. A special clause forbade any member of the Napoleonic family to ascend a European throne.

Metternich, the arch foe of constitutional government, was the leading spirit of the real, the working alliance. Absolute princes whom Napoleon had deposed were restored. Constitutions were abolished, notably that of Spain by armed intervention in 1823. The evident disposition of the Alliance to interfere in the affairs of the newly formed Spanish-American republics led to the enunciation of the Monroe Doctrine. The inability of the czar to resist the temptation to aid the Greeks in throwing off the yoke of their enemy of old, the Turk, almost disrupted the Alliance. The Alliance crumbled after the French Revolution of 1830.

Holy Land. See PALESTINE.

Holy Roman Empire, often called the German Empire. It began with the coronation of Charlemagne in 800. It was renewed by Otto the Great in 962 and ended with the abdication of Francis II in 1806. The empire was in theory the political counterpart of the Holy Catholic Church. A mosaic of the tenth century hanging in the church of St. John in the Lateran of Rome represents the pope and the emperor kneeling at the footstool of Christ. With one hand, Christ bestows the keys of heaven, emblem of spiritual authority, on the pope; and with the other hand, he bestows the standard of the empire, emblem of temporal sovereignty, on the emperor. The Holy Roman Empire was a revival of the notion of a universal empire analogous to a universal church. It included in general the German speaking people of central Europe, and was connected closely with Italy. Various regions outside of Germany were included at times in the empire. The important dynasties were the Carlovingian, represented by Charlemagne; the Saxon, represented by Henry the Fowler; Otto I; the Franconian line, including Henrys III, IV, and V; the Hohenstaufen, represented by Frederick Barbarossa; the Hapsburgs, including Maximilian I and Charles V.

> Neither holy, nor Roman, nor an empire.—Voltaire.

> The theory of the Medieval Empire is that of a universal Christian monarchy. The Roman Empire and the Catholic Church are two aspects of one society, a society ordained by the Divine Will to spread itself over the whole world. At the head of this society in its temporal character, as an empire, stands the temporal chief of Christendom, the Roman Caesar. At its head in its spiritual character, as a church, stands the spiritual chief of Christendom, the Roman Pontiff. Caesar and Pontiff, alike, rule by divine right, each as God's immediate vicar within his own sphere. *Each is bound to the other by the closest ties . . . And each of these lofty offices is open to every baptized man;* each alike is purely elective. . . . Here is a conception as magnificent as it was impractical.—E. A. Freeman.

Holyrood. See EDINBURGH.

Holyoke, a well-known manufacturing city of Massachusetts, on the Connecticut River. A huge dam has been constructed there which, with the sixty foot falls of the river, gives the city more water-power than any other place in New England. As a result manufacturing is the leading industry. The leading product is paper in many forms, this manufacture being one of the largest of the sort in the world. Other products are silks, cottons, woolens, thread, automobiles, bicycles, machinery, steam engines, wagons, carriages, etc.

Holyoke owns its own gas and electric lighting plants and water system, being a leader in municipal ownership enterprises. It has one of the best systems of public playgrounds in the country. Being in the center of a very picturesque mountain region celebrated for its scenery, it is exceedingly healthful and desirable as a residential city. It is the center of a circle of educational institutions including Smith College and Mt. Holyoke College for girls, Amherst and the State Agricultural Colleges for boys, and a State Normal School, —all within a radius of a few miles and easily accessible by electric cars. The population in 1920 was 60,203.

Home Economics, in a broad sense the science of household management. Since the public first awoke to the idea that housekeeping might become a science in the true sense of the word, a great variety of terms, such as domestic science, domestic economy, household arts, home science, and household technology have come into common use, any one of them serving to designate any phase of the subject. As a department of education, however, the term home economics has been accepted generally as the title of such courses as belong properly to college and university, while household or domestic science and household or domestic art designate the courses offered in secondary schools, which are in the main of a practical character, yet include enough elementary science to serve as preparatory for the more advanced and more technical college courses.

The history of the development of the science of home economics is not a long one, but the advance has been rapid. In 1870 Catherine Beecher published a *Treatise on Domestic Economy,* in which she suggested that the subject be placed on an equality with other sciences in schools for women. The first five training schools for women were organized in New York City in 1870. Other schools both private and public were organized, and a course of lectures on cooking became popular. With the development of the industrial spirit and the success of colleges of agriculture and mechanical arts which provided for men training for the work of field and shop, the movement concerned with training women for home-makers spread also, until at present the majority of our universities, and many colleges and normal schools offer complete courses in home economics. In the public schools also of our cities, and in many instances of our villages, courses in cooking and sewing are becoming a popular feature of the curriculums. Probably no one thing has been of greater influence in the recent rapid advance along this line than the increased cost of living, which has led the most indifferent to realize the need of trained housekeepers. Among higher institutions of learning which stand first in the work of home economics may be mentioned Pratt Institute, New York, Simmons College, Boston, the universities and colleges of Illinois, Iowa, and Kansas, and the Schools of Household Arts of Teachers College, at Columbia University.

A typical course includes such subjects as physiology, personal hygiene, public hygiene, bacteriology, cooking, dietetics, chemistry, child study, home nursing, sewing, millinery, construction of houses, home decoration, sanitation, heat, marketing and accounts, laundry work, textiles, etc.

The World War changed the current of home economics education, and methods of conserving food supplies, etc., took the lead. But in 1920 the United States Commissioner of Education reported that home economics educational courses had undergone a satisfactory reorganization following the disturbed condition due to the war. A vigorous and sustained effort had then developed to emphasize, in all classes, the relation of home economics instruction to healthful living, financial thrift and social service.

Since the war a number of extraneous forces have reacted upon home economics education. The widespread interest in child health and welfare, with special stress upon the widely prevailing condition of malnutrition, has opened avenues to women trained in home economics for service in the conduct of food clinics, nutrition classes, and the redirection of school lunchroom management. Physicians and hospital authorities have recognized, more than ever before in the practice of medicine, the relation of diet to disease, and the need of women highly trained in home

economics as prescribing dietitians. Operators of industrial plants and managers of mercantile establishments have employed such trained women to supervise their social service. Banks have established graduates in home economics as advisors of their women depositors in methods of wise spending. These forces have modified, as well as intensified, the home economics instruction given in universities, colleges and normal schools.

In 1921 all the state universities except six, and all land-grant colleges for white students except five, offered courses of study in home economics. Those which do not provide for this instruction are usually institutions for men which either exclude women or discourage their attendance. One hundred and seventy-six normal schools support home economics departments and in 1921 employed 379 teachers; 306 colleges and universities employ 1,133 teachers of home economics. Besides these institutions, almost all academies and junior colleges admitting girls offer courses in this subject.

Home economics is now accepted in many liberal arts schools as an essential part of a woman's well-rounded education. This sentiment is reflected, for example, in the University of Oregon, where there is a strong demand for certain courses that will be of special value to students preparing for professional life as journalists, doctors, social workers, physical-training teachers, etc. New courses in child-feeding and child-welfare have been added to the home economics departments of many institutions of higher education recently, and special instruction in advanced nutrition classes has been given a prominent place in these schools.

Specialized courses for dietitians are now offered in all leading home economics schools. A typical course is that at Drexel Institute, Philadelphia, which comprises two years' work after student graduation. The students carry standard courses in organic chemistry, inorganic chemistry, technical chemistry, physiological chemistry, and pathological chemistry, physics, bacteriology, physiology, accounting, principles of food preparation and nutrition, institutional cookery, and management. Graduates of the University of Wisconsin, the Ohio State University, Iowa State University, and other similar institutions are now prepared to be prescribing dietitians. And it may be remarked that the demand for highly-trained graduates of home economics courses is often greater than the supply.

There were by 1921 more than 8,000 public high schools offering the opportunity to girls to elect one or more years of home economics work, and the annual increase in the number of high schools offering home economics has been about 600 for some years past. Of 311 high schools in Illinois which replied to a recent questionnaire from the United States Bureau of Education, it developed that 184 maintained courses in home economics and enrolled 13,334 students in regular high-school economics and 1,753 in high-school classes aided under the Smith-Hughes law.

The number of public elementary schools maintaining departments of home economics is continually increasing. Two-thirds of all the larger school systems of the United States reported in 1920 that home economics study is required of all girls in the seventh and eighth grades. In many cities it is also required of girls in the fifth and sixth grades. The great number of girls reached by instruction in home economics is indicated by reports from Boston, Philadelphia and Los Angeles which showed that in those three cities alone 84,975 girls in the elementary schools were receiving some training in household arts.

The Smith-Hughes Act, referred to above, was the most notable Federal legislation relating to home economics. It was signed by President Wilson February 23, 1917, and appropriated money to assist in the establishment and maintenance of vocational schools in industry, home economics, trade, and agriculture; and further provided national aid for training teachers for these vocational schools. Another Act of Congress which had important bearing upon home economics education was one which made possible the maintenance of urban extension work in

home economics. Urban agents have since been appointed in many cities, and the work of spreading more general intelligence relating to home-making now covers both city and country.

Home Rule. See IRELAND.

Home, Sweet Home. See PAYNE.

Homeopathy. See HAHNEMANN.

Homer, the greatest name in Greek literature. Whether Homer is to be regarded as a bard or a circle of minstrels is uncertain. Our actual knowledge is confined chiefly to the fact that the Greeks have two great epics of wondrous beauty, the *Iliad* and the *Odyssey*. These poems have from great antiquity been attributed to a blind poet named Homer. Seven Greek cities claim the honor of his birth. No less than eight fragmentary lives of Homer in the Greek language are extant. Critics are of the opinion that epics named are the work of many minstrels, and that they were handed down from one generation to another as separate ballads, until in an early age of Greek literature, some editor, possibly a Homer, brought them together. One of the strongest arguments for this theory is that different portions of the poems are quite different in style. They were composed evidently long before the art of writing was known in Greece. They contain many thousand verses. Both epics deal with the capture of Asiatic Troy by the Greeks. The *Iliad* opens with a quarrel between the Greek leader, Achilles, and Agamemnon. The quarrel between these chiefs is described with minuteness. Hector, the hero of Troy, slays Patroclus, the bosom friend of Achilles. Achilles is aroused, patches up a truce with Agamemnon and rushes into battle. He kills Hector. The poem closes with an account of Hector's funeral.

The *Odyssey* relates the return of King Odysseus to Ithaca. During his absence numerous suitors for the hand of his wife Penelope have devoured his living and disgraced his household. Odysseus is delayed by various adventures, but finally comes home in the disguise of a beggar and takes vengeance on those who had invaded his home and annoyed his wife.

Memorizing selections from Homer is a regular part of the school work of modern Greece. The Athenian schoolboy recites Homer quite as the American boy recites passages from Longfellow or Lowell.

See ILIAD AND ODYSSEY.

Homestead Law, an act signed by President Lincoln May 20, 1862. It marked the beginning of a new public policy with reference to lands. Within ten years 28,000,000 acres of public land were homesteaded. As early as 1852 the Free Soil party, in the interest of white farmers, agitated the plan of permitting settlers to occupy public lands free of charge. Southern members of Congress preferred to continue the old method of selling land in tracts, as it gave a planter an opportunity to obtain a plantation large enough for the profitable employment of slaves. A homestead bill was introduced repeatedly. Galusha Grow championed the homestead act on the floors of Congress for ten years. An act passed both houses of Congress in 1860, but President Buchanan vetoed it on the ground that free farms would be an injustice to old settlers who had paid for their land, that the older states would lose their population under the stimulus of free lands, and that it was a questionable public policy to invite foreigners to take up free homes in this country. By the provisions of the act as finally passed, any citizen or person who has declared his intention to become a citizen, whether male or female, if twenty-one years old and the head of a family, may become the owner of a homestead of 80 or 160 acres merely by living on it and cultivating a field. This does not now apply to those who already are owners of 160 acres of land. An unmarried woman twenty-one years old may take a homestead. A married woman loses her right so long as her husband is living. The only charge made is one for land office fees, amounting in all to not over $34. During the decades immediately following the passage of the act an enormous immigration of desirable settlers poured in from the northern countries of Europe. The act is still in force. There are not far from 300,000,000 acres of land now surveyed and subject to homestead entry. Recent homestead laws provide for enlarged homesteads of 320 acres

on non-mineral, non-irrigable and timberless land in Utah, Wyoming, Washington, New Mexico, Oregon, North Dakota, South Dakota, Arizona, California, Colorado, Idaho, Montana and Nevada; and for stock-raising homesteads of 640 acres on land that is unavailable for other than grazing or forage-growing purposes.

CANADA. Any Canadian who has reached the age of eighteen may become a homesteader, and in Canada a homesteader is required to live upon his land one-half of each year for three years and must cultivate not less than twenty acres of new ground each year during this period. The Dominion preemption law provides that a settler may purchase, at three dollars an acre, government land adjoining his to the extent of 160 acres, of which he must cultivate 50 acres. After the World War the Canadian government made liberal concessions in favor of returned soldiers who wished to acquire homesteads. See IRRIGATION; PUBLIC LANDS.

Homestead, Pa., in Allegheny County, is an important manufacturing town situated on the Monongahela River, seven miles southeast of Pittsburgh. Its transportation facilities both by rail and by water make it one of the most desirable manufacturing sites along the Monongahela River. In this city in 1892 occurred the famous Homstead Strike. This strike lasted about three months and settled a much mooted question at that time; namely, the open shop question. The Carnegie Mills of the United States Steel Corporation located in this city are considered the "backbone" of the Carnegie Steel Corporation. About twelve thousand men are employed by this company. Mesta Machine Company is also located in this district. Carnegie public library, splendid schools and magnificent churches are found here. The water works and electric light plant are municipally owned. Population in 1920, 20,452.

Homicide, from the Latin "homo—man" and "cedere—to kill," is the legal definition of the killing of one person by another. Broadly interpreted, homicide includes wilful murder (See MURDER), accidental killing, and justifiable killing, so-called. The latter is the killing of one person by another in defense of his life or his home, in the discharge of his duty, or to prevent murder or some other atrocious crime. Under the circumstances enumerated, homicide is said to be excusable, or justifiable, and as such is not legally punishable. Homicide committed under any other circumstances, however, is considered manslaughter, or murder, and is punishable, the death penalty often being inflicted.

Honduras, hŏn-dōō′ras, a republic of Central America, formerly a province of Guatemala. The name is Spanish, signifying depth, in allusion to the depth of water on the coast and the difficulty of finding anchorage. The area is 46,250 square miles, approximately that of Mississippi. Population 637,114. The general aspect of the country is mountainous. The valleys, plains, and lower slopes are clothed with dense forests. The animals, birds, and insects are much like those of the Amazon Valley. The inhabitants are chiefly Spanish-speaking Indians, with a few white people of Spanish descent. The chief product is bananas. The San Pedro district of Honduras in 1920 exported 11,524,149 bunches of bananas valued, in U. S. dollars at 2,832,238. More than three hundred ships annually call at Honduras ports for cargoes of bananas. Tobacco, sugar, maize, oranges, sarsaparilla, beans, coffee, indigo, rice, and wheat are grown in varying quantities. Cattle raising is carried on in the uplands. The mountains abound in gold, plantinum, silver, copper, lead, zinc, and iron. The coast is exceedingly hot. The climate in the elevated interior is more tolerable. The capital of Honduras is the city of Tegucigalpa. A number of small towns on the Caribbean coast ship bananas, coffee, mahogany, cocoanuts, rubber, plantains, oranges, pineapples, sarsaparilla, hides, cattle, deerskins, and tortoise shells.

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Area, square miles	44,275
Population (1921)	637,114
Chief Cities:	
Tegucigalpa	38,950

La Esperanza	11,453
Santa Rosa	10,574
Choluteca	8,065
San Pedro Sula	7,820
Number of departments	17
Members of Congress of Deputies	42
National revenue	$ 6,674,894
Bonded indebtedness	$25,000,000
Imports	$20,903,350
Exports	$ 6,785,735
Bananas exported, bunches	11,524,149
Cocoanuts exported	12,647,508
Tobacco, pounds	1,700,000
Rice, pounds	7,693,500
Coffee, pounds	6,711,900
Domestic animals, total	500 000
Cattle	103,120
Gold, ounces	9,110
Silver, ounces	1,979,686
Miles of railway	463
Teachers in public schools	1,107
Pupils enrolled	45,301

Hone. See WHETSTONE.

Honey. See BEE.

Honey Locust, an ornamental tree belonging to the legume family. It is known to the botanist as Gleditschia. It is called also the sweet locust, and the three-thorned acacia. It grows to a height of from 70 to 140 feet. The branches bear stout spines, three to four inches long. The leaves are twice pinnate, with from twenty to thirty leaflets. The branches spread gracefully, forming a fine shade. Greenish flowers appear early in summer. They are less conspicuous than those of the common locust, but the sickle-shaped pods are from twelve to eighteen inches long and are decidedly ornamental. When young they are filled with a sweet pulp, giving the tree its common name. The honey locust flourishes from Pennsylvania southward. When kept low and pruned closely, it makes an excellent thorny hedge. The wood is close grained, strong, and durable. See LOCUST.

Honeysuckle, or **Woodbine,** climbing or bushy shrubs with funnel-shaped, usually two-lipped flowers. In many species opposite leaves are united at their bases so that the stem seems to grow through the middle of the leaf. The honeysuckle of literature, or English woodbine, is a beautiful thicket climber with whorls of creamy, fragrant flowers. Shakespeare speaks of a bank "Quite o'er canopied with luscious woodbine," and Milton in his *Lycidas* mentions "The musk rose and the well attired woodbine." The American woodbine or trumpet honeysuckle is also a fine, fragrant climber, with white, purple-tubed flowers fully an inch in length. There are at least nine wild honeysuckles in the eastern part of the United States and Canada. There are a hundred species in the northern hemisphere. Columbines should not be called honeysuckles. There is no similarity or relationship.

Hong Kong, an island off the southeast coast of China. It lies at the mouth of the Canton River. It was ceded to Great Britain in 1841. It has an area of about twenty-nine square miles. In 1898 a promontory on the mainland having an area of 376 square miles was leased for a period of ninety-nine years. These tracts, together with adjacent islands, have a population of about one-third of a million. The capital of the district is the city of Victoria. It extends along the northern shore of the island of Hong Kong, having a water frontage of about four miles. The non-Chinese population is about 14,000. Though several times as large, Hong Kong bears about the same relation to Victoria that the District of Columbia does to the city of Washington. It is a colony, not a city. The island has been fortified. It is a naval station and a base of military supplies of the first importance. The governor receives a salary of about $35,000 a year, and has a full complement of subordinate officers. Schools are maintained. Hong Kong, that is to say, the port of Victoria, is the center of British trade and influence in China. It has an enormous trade. No duties are imposed. The exports to Great Britain amount to about $130,151,915 annually. English merchants sell cotton and woolen goods, iron, machinery, copper and coal. The city is served by about 80 steamers, 55 large sailing vessels and 24,000 fishing boats and other small craft and junks. It is estimated that 15,000 fishing boats and other small craft constantly frequent the harbors and bays of Hong Kong. There is an excellent dry dock in which vessels may be repaired. Population, 1921, 625,166.

Honolulu, the capital and chief port of the Hawaiian Islands. It lies just below

the Tropic of Cancer, in the direct route from San Francisco to the Philippines. It is the commercial metropolis of Polynesia and is a port of call for nearly all lines of Pacific steamers. It is from eleven to sixteen days distant from San Francisco. The population, January 1, 1920, (United States Census), was returned as 83,327. There is an excellent harbor, protected by a natural breakwater of coral. The city is laid out in checkerboard fashion. The residences are chiefly of a light summer cottage style. Houses require to be well roofed, as the rainfall averages fifty inches annually. The construction is slight. The streets and dooryards are shaded by tropical tres, including the cocoa-palm, bread-fruit, and bamboo. Ornamental shrubs and flowers are in bloom the year around, frost being unknown. Artificial ice is made by the ammonia process. A marine aquarium is an object of interest. One of the native curiosities kept in the capitol is a yellow feather war cloak once the property of a Hawaiian king. It is composed of tufts of down, each taken from a spot beneath the wing of a rare mountain bird. The islanders were two centuries in securing enough material for the garment. There are over a score of public school buildings, numerous churches, city water works, an electric light system, and an electric street railway. A number of manufacturing interests are well established. Shipbuilding is an important industry. Wireless telegraphy is maintained with a mountain top near San Francisco. Seven lines of steamers connect Honolulu with the world. Seventeen small steamers ply between the city and the various islands. See HAWAII.

Hood, John Bell (1831-1879), an American soldier. He was born at Owingsville, Kentucky, and studied at West Point from which he was graduated in 1853. Eight years later he entered the Confederate Army as a colonel, later attaining the rank of brigadier-general. He played a prominent part in the Virginia campaigns; at the battle of Gettysburg his division was in the thickest of the fight; he lost a leg at Chickamauga. In 1864 he commanded a force under Johnston, whom he succeeded in command in July of the same year. After a number of unsuccessful battles with Thomas, Hood asked to be relieved of his command. When the war was over he engaged in business in New Orleans. General Hood has written a book on his experiences in the army.

Hood, Robin. See ROBIN HOOD.

Hood, Mount, a peak of the Cascade Range, now an extinct volcano, in the northern part of the state of Oregon, in Wasco County, and about fifty miles south of the Columbia River. It is about fifty miles east by south of Portland, from which it may be reached by rail to Hood River, and thence by stage to the base of the northern glaciers. It has a height of 11,225 feet, and there are many glaciers and high precipices. It may be ascended without much difficulty by good climbers. The trip is well worth the effort, for at the summit the view is magnificent and extensive.

There have been no eruptions from this volcano since 1875.

Hood, Thomas (1799-1845), a humorous English poet, the author of *The Song of the Shirt.* He was a native of London, and was intended by his relatives for a mercantile life, but the drudgery of the counting room proved detrimental to his health, while his poetic temperament "turned his stool into a Pegasus on three legs." The friend who had undertaken his training discharged him, and the young man next tried engraving. This served to develop some talent for drawing, but his health was unequal to the work. Having attracted attention by articles for various magazines, he was offered a position in 1821 as an assistant editor of the *London Magazine.* From this time on his chief occupation was editorial work, including the writing of essays and humorous poems. From 1830 to 1838 he edited the *Comic Annual.* In 1838 he began the publication of *Hood's Own,* was editor of the *New Monthly Magazine* for two or three years, and in 1844, started his last periodical, *Hood's Magazine,* which contained some of his best work, although written when his health was utterly broken and he had to be propped up in bed to write. Hood married Jane Reynolds, a cultivated woman of strong character. He

counted many famous names on his list of friends, among them the Lambs, De Quincey, Hartley Coleridge, and Proctor, Their unfailing friendship and support and the devotion of his family were the compensations in his struggle against poverty.

Hood's first published volume was *Odes and Addresses;* the next, *Whims and Oddities,* which appeared in 1826. While editing his various periodicals, he also published *Tylney Hall,* a novel, *Up the Rhine,* a series of imaginary letters, and produced sonnets, odes, and lyrical poems of great merit. His writing is full of puns and comic turns of wit, mingled with humor and pathos most unexpectedly. It has been regretted frequently that Hood carried his wit to such an extreme. His talent is so evident in his lyrical writings that it seems he should have been something more than a "minor poet." It is a question whether the tendency was innate in the man himself, so that he wrote puns instead of poems, because he couldn't help it; or whether, as Stedman would have us believe, he wrote what the public demanded because he was so hampered by poverty that he was unable to give free expression to his own genius. Certain it is that during his lifetime readers expected to laugh at all that came from Hood's pen. It is the *Song of the Shirt* and the *Bridge of Sighs* that will live, however, and that would make Hood's name remembered had he written no word beside. Seven years after his death a beautiful monument was erected above his grave. Stedman says that the English people gave eagerly for the monument. "The rich gave their guineas; the poor artisans and laborers, the needle women and dress-makers, in hosts, gave their shillings and pence. Beneath the image of the poet which rests upon the structure are sculptured the words which he himself, with a still unsatisfied yearning for the affection of his fellow-beings, and a beautiful perception of the act for which it long should be rendered to his memory—devised for the inscription: 'He sang The Song of the Shirt.'"

SAYINGS OF HOOD.

But evil is wrought by want of thought,
As well as want of heart.

Gold! gold! gold! gold.
Bright and yellow, hard and cold.

Alas for the rarity
Of Christian charity
Under the sun

He lies like a hedgehog rolled up the wrong way,
Tormenting himself with his prickles.

The hypocrites who ope Heaven's door,
Obsequious to the sinful man of riches,
But put the wicked, naked, bare-legged poor
In parish stocks instead of breeches.

SAID OF HOOD.

"He had a portion of almost every gift belonging to a true poet, and, but for restricted health and fortune, would have maintained a higher standard."—Stedman.

"That *Song of the Shirt,* which *Punch* first published, and the noble, the suffering, the melancholy, the tender Hood sang, may surely rank as a great act of charity to the world, and call from it its thanks and regard for its teacher and benefactor. That astonishing poem, which you all of you know, of the *Bridge of Sighs,* who can read it without tenderness, without reverence to Heaven, charity to man, and thanks to the beneficent genius which sang for us nobly?"—Thackeray.

A son of Thomas Hood of the same name was also an author, the editor of a comic paper, a writer for children and a famous punster. He wrote over the name of Tom Hood.

Hook and Eye, a well known fastening for garments. The hook and eye of two pieces was known in the fourteenth century. Hook and eye machines have been invented. Wires are fed through a machine; pieces are cut off and are bent into shape complete at the rate of 200 a minute. The finishing and sewing to cardboard is done also by machinery. After the wire has once been fed, it is not necessary to touch the material with the fingers. Hooks and eyes are sent to market either stitched on cards or in small pasteboard boxes. The factories of the United States alone turn out hooks and eyes to the annual value of half a million dollars at wholesale. See PINS; BUTTONS.

Hooker, Joseph (1814-1879), an American general. He was a native of Hadley, Massachusetts, and was graduated from West Point in 1837. He served with credit in the Mexican War. During the Civil War he rose to the command of the army of the Potomac. In 1863 he was sent to reinforce Rosecrans at Chattanooga. As commander of the army of the Cumberland he fought the so-called battle among the clouds on Lookout Mountain. He was

known among his soldiers as "Fighting Joe Hooker."

Hooker, Sir William J. (1785-1865), a celebrated English botanist. He was a native of Norwich. He was bred a merchant, but preferred an outdoor life. He devoted himself to the study of botany. Contributions to a better understanding of the mosses led to his appointment to the chair of botany in the University of Glasgow. In 1841 he was made director of the Royal Gardens of Kew, a position which he filled with honor.

His important works include a score of titles. The best known is perhaps *The British Flora,* a work which has been to the British Islands what *Gray's Manual* has been to the northeastern United States. See GRAY.

Hooker, Mount, a lofty peak in the Rocky Mountains of Canada, about 16,690 feet high, is on the boundary line of British Columbia and Alberta. In 1826 this mountain peak was visited by David Douglas and other botanists, and was named for one of the party.

Hook-Worm, a worm parasitic in the intestines of man and certain of the lower animals. The hook-worm is a hair-like animal. It looks like an inch of dirty gray thread. It was described in 1782 by a German zoologist who found it in badgers. A few years later it was found by another German in the intestine of a fox. The latter, noting certain rib-like supports in the flaring tail of the male, mistook them for hooks, and gave the name of *Haakenwurm,* of which our hook-worm is a translation. The word is not a misnomer, for the mouth is provided with four sharp hooks, the use of which will be mentioned later. Subsequently, the hook-worm was discovered in other animals, notably the dog and the horse. In 1879 an epidemic broke out among the Italian laborers who were constructing the St. Gothard Tunnel. It was found that the soil of the tunnel and the camps was filled with the eggs and larvae of the hook-worm. Once medical attention had been arrested, it was found that the hook-worm malady existed very generally in unsanitary gangs of Italians engaged in brick-making, constructing sewers, and similar occupations. The situation was no sooner under scrutiny than reports came in from Japan, Calcutta, Ceylon, Borneo, the Kimberley mines, Cape Colony, Egypt, Algiers, Abyssinia, Zanzibar, Madagascar, and other warm localities. Immigrants brought a case or two to America. Government experts found that dogs in the vicinity of Washington, D. C., were affected.

Dr. Smith, investigating an epidemic among the sheep of Texas, found a good half of some flocks dying from lack of blood produced by a hook-worm parasite. In 1896 he relinquished medical practice to search for an American hook-worm parasitic in man. To make an exciting story short, physicians were amazed—simply dumbfounded—to find that in the region between the Potomac and the Gulf of Mexico, no less than two million people of sound English ancestry were dragging feeble bodies, emaciated by the hook-worm. Shiftless, lazy "crackers," "poor whites," "poor white trash," "clay eaters," were the popular terms used to describe them. "Bloodless, anemic," said the doctors. "Their very blood has been sucked out of them, let out of them by hook-worms," says the medical expert. Generations of these Southern whites have craved dirt, have grown feeble, have had spasms, have bought carloads of patent medicines, and have gone through the world "shiftless" and "lazy," without knowing what was the matter with them. When science began to hunt for the cause, people roared over the search for the "lazy germ," but the medical experts went right on to the rescue of "emaciated men trying to wrest a living from half-tilled fields, and women, to whom rest never came, trying to nurse starveling babes at withered breasts." As Dr. Stiles said in a public address, and nobler words were never spoken on a battlefield, "It isn't a thing to laugh about, when women and children are dying." The "lazy germ" has been located. Science gives the patient a dose of thymol, the oil of thyme, to kill the hook-worm of which there may be from half a dozen to forty-six thousand in a single individual.

The life history of the hook-worm has been traced with intense interest. The adult animal presses its mouth against the wall of the human intestine, drawing a circular

portion of the soft membrane into its gullet. Four sharp hooks set in the end of the gullet lay hold of the bit of intestine, a sharp lancet is thrust again and again into the space, bringing a current of blood with which the hook-worm gorges itself. A serum injected into the incisions prevents coagulation and stoppage of flow. After a time the hook-worm hunts a new place and repeats the operation. The incisions may continue to bleed, producing a flow of blood, or they may admit bacteria and become ulcers, or the spots may heal and harden and become useless for purposes of digestion. A few hook-worms may accomplish little beyond making the host feel that he is not right, but thousands produce emaciation and even death.

When the adult has reached the proper stage of growth thousands of eggs are produced. The eggs cannot hatch in darkness. They go with the body waste and hatch out in the open sunlight into worm-like larvae. They feed on filth. They pass through various larval stages. They crawl for yards through the warm earth of the south, seeking animal hosts. No doubt many enter the human body in meat and drink, but they do not depend on this method. If water containing the young be held in the palm of the hand, a prickling may be felt between the fingers. The unseen pests—tiny—miscroscopic—are boring in, and the flesh smarts. Half clothed children sitting and playing on contaminated soil become infested. The tiny larvae enter the pores of the skin and the follicles of the hair. They get into the capillaries and are hurried by the blood through the veins into the heart. From the heart they hasten with the blood into the lungs. Here they penetrate the lung cavities. They follow the cavities into the trachea. They crawl up the wind pipe and down the swallow into and through the stomach into the intestine of man. Many of the larvae die ere they complete the journey; many are killed by the lymph and are swept out of the body. Others reach their destination and develop, vampire fashion, and breed as described. How do doctors know so much? By observation, killing and examining animals. One eminent surgeon about to amputate a man's leg, washed it first carefully in soap and water, and then placed on it a drop of infected water. Ere the leg could be amputated and a section of skin be placed under the microscope, many of the larvae were half buried, and many were already out of sight within the skin.

In 1909 John D. Rockefeller placed $1,000,000 at the disposal of the United States Marine Hospital Service for use in fighting the hook-worm. This fund made possible the organization of the Hook-worm Commission, which has made valuable discoveries and suggested methods of control. Boards of health in some of the states in the South have also given careful attention to preventing the hook-worm disease. The following method will usually enable any community to control and stamp out the disease.

1. Cure all infected persons. The patients should abstain from food and take a laxative, which should be followed by thymol, administered under the directions of a physician. Thymol kills the worms.

2. Wear good shoes when on low, wet ground and refrain from wading or bathing in streams or lakes in infected districts.

3. Clean up all infected premises and keep them clean.

4. Install a good system of drainage.

5. Boil or filter all drinking water in infected districts.

The Public Health Service of the United States Department of the Interior publishes a number of bulletins on the hook-worm, which can be obtained by writing for them.

Hoosac Tunnel, a double-track railway tunnel through the Hoosac Mountain in northwestern Massachusetts. It is on the route from Boston to Troy. Its eastern entrance is 137 miles from Boston. The tunnel is nearly five miles long, the longest in the United States. It was seventeen years in building, and cost $13,000,000. The circulation is improved by a ventilation shaft near the middle. This shaft, over 1,000 feet in depth, acts like a tall chimney. See TUNNEL.

Hoover, Herbert Clark, (1874——), an American engineer, born at West Branch, Iowa, and educated at Leland Stanford, Jr., University. He began his

work with the Arkansas Geological Survey but soon became connected with the Geological Survey of the United States. In 1899 he was appointed chief engineer of the Chinese Imperial Bureau of Mines.

In 1914, Hoover went to London as chairman of the American Relief Commission, and in 1915 he was made head of the Belgian Relief Commission, where his integrity, tact and executive ability gave him a world-wide reputation. In 1915 President Wilson appointed him head of the United States Food Administration. His orders for conserving food were cheerfully obeyed by the American people, and the country was able to send large supplies to the destitute in the war-stricken regions of Europe. In 1919, Mr. Hoover headed a commission for feeding the starving millions of Europe. In March, 1921, he became Secretary of Commerce in President Harding's cabinet. He also assisted in relief work for Russia.

Hop, a twining, rough-leaved vine of the nettle family. The common hop is native to Europe and North America. Hop vines are excellent arbor plants, but are cultivated usually for their loose, papery, fragrant catkins which are used in the brewing of beer. The valuable part of hops is the bitter principle contained in the granular powder on the scales and the inner shell of the tiny seed. It constitutes a sixth of the weight of the best hops. Hop yeast is the best also for raising bread. Southern England is famous for hops. Bavaria has a reputation for the best. Two regions of the United States raise excellent hops. The first extends from Maine to Iowa; the second from California to Oregon. The annual hop production of the United States is over 30,000,000 pounds, and is valued at $7,000,000. Hops are planted in hills. Each hill requires a pole ten to eighteen feet high, to support the vines. After the bearing season the vines die to the ground, the poles are stacked away for next year's use, and the field is cleared of old vines. The hop twines toward the right or with the sun; that is to say, the tip of the vine points toward the west when it is on the south side of the pole. Named in order of productivity for the year 1920, the leading hop countries of the world are the United States, Great Britain, Germany, Czechoslovakia, France, Belgium and Austria. The world's crop for the year 1905 was 274,626,000. In 1920 it was 105,514,000. See BAVARIA; BEER.

Hope, Anthony. See HAWKINS, ANTHONY HOPE.

Hopi. See MOQUI.

Hopkins, Johns, a Baltimore merchant. He was born May 19, 1795, in Anne Arundel County, Maryland, and died at Baltimore, September 24, 1873. His father was a Quaker farmer. He engaged with his brothers in the wholesale grocery business and amassed a large fortune. In 1847 he withdrew from the trade and engaged in banking and in railroad financiering. During the last year of his life he gave $3,000,000 to found the University that bears his name, and $4,500,000 to establish a free hospital. Baltimore is also indebted to his liberality for a public park. See JOHNS HOPKINS UNIVERSITY.

Hopkins, Mark (1802-1887), a well known president of Williams College, Massachusetts. He was born at Stockbridge, Massachusetts, February 4, 1802, and died at Williamstown, June 17, 1887. He was graduated at Williams, and filled various positions in that institution until called to the presidency in 1836, a position which he held until 1872. He took a deep interest in foreign missions and wrote a number of ethical works, the most noted of which is perhaps his *Lectures on Moral Science.* He is the college professor to whom President Garfield, in addressing the Department of Superintendence at Washington, December 11, 1877, referred:

> It has long been my opinion that we are all educated, whether children, men, or women, far more by personal influence than by books and the apparatus of schools. If I could be taken back into boyhood today, and had all the libraries and apparatus of a university, with ordinary routine professors, offered me on the one hand, and on the other a great, luminous, rich-souled man, such as Dr. Hopkins was twenty years ago, in a tent in the woods alone, I should say give me Dr. Hopkins for my college course rather than any university with only routine professors. The privilege of sitting down before a great, clear headed, large hearted man, and breathing the atmosphere of his life, and being drawn up to him and lifted up by him, and learning his methods of thinking and living, is in itself an enormous educating power.

The words given are from the official records kept by Secretary Irwin Shepard. They have given rise, no doubt, to the expression now proverbial. "Mark Hopkins on one end of a log and a student on the other."

Hopkinson, Joseph (1770-1842), an American jurist, the son of Francis Hopkinson, an American political writer, was born in Philadelphia. After leaving school he studied law, and became one of the ablest lawyers of his time. He was the author of the famous patriotic song, *Hail Columbia*, which he at first called the *President's March;* this immediately became popular and helped to keep up the patriotism of the people.

Horace, hor'ĕs (65-8 B. C.), a Latin poet whose full name was Quintus Horatius Flaccus. He was the greatest of Roman writers. He was born near Naples. His father, who had been a slave, was a collector of taxes. Young Horace was educated at Rome and Athens. In the latter city he became interested in philosophy. He describes himself while there as "searching after truth among the groves of the Academy." In politics and war, Horace followed the fortunes of Brutus. He shared in the rout which followed the battle of Philippi, and makes reference in one of his odes to the inglorious casting away of his shield. When Augustus became supreme Horace returned to Rome and was stripped of his property. He secured a clerkship and shortly after became acquainted through his friend Virgil with Maecenas, the great patron of Roman letters, whose protection he henceforth enjoyed. He was now able to devote himself to literature. Maecenas gave him a farm in the Sabine hills near Tivoli. Here he led the quiet life of a student and poet, exchanging its peace, when he desired, for the excitement of the city. His works consist chiefly of odes, satires, and epistles. It has been said that the satires were inspired by his life in Rome, the odes by his life on the Sabine farm. His *Ars Poetica,* or *The Art of Poetry,* a composition in verse, contains sound advice to young writers. The works of Horace are considered too difficult for high schools and academies, but they are favorites with the college student of Latin. The influence of Horace is ever wholesome, as will be seen from these selections:

SAYINGS.

Govern your passions, otherwise they will govern you.

There is a medium in all things.

A well prepared mind hopes in adversity and fears in prosperity.

I count not the votes of the fickle mob.

It is not every man's lot to gain the port of Corinth.

He alone is rich who makes a proper use of his riches.

Virtue even in rags will keep warm.

Brave men were living before Agamemnon.

Even the worthy Homer sometimes nods.

The envious man grows lean at the success of his neighbors.

SAID OF HORACE.

No ancient writer has been at once so familiarly known and so generally appreciated in modern times as Horace. . . . From his *Satires,* which deal chiefly with the manners and outward lives of men, we know him in his relations to society and his ordinary moods; from his *Epistles,* which deal more with the inner life, we best understand his deepest convictions and the practical side of his philosophy; while his *Odes* have perpetuated the finest pleasure which he derived from art, nature, and the intercourse of life, have idealized some of the graver, as well as the lighter aspects of his reflection, and given an elevated expression to his sympathy with the national ideas and movement of his time.—William Y. Sellar.

Horae, hō'rē, the Hours, in Greek mythology, goddesses who preside over the seasons. They are servants of Zeus and Hera and have charge of the weather. Hesiod mentions three Horae, "Good Order," "Justice," and "Peace." In other accounts two are mentioned, and in still others, four. The course of the seasons was represented symbolically in the dance of the Horae.

Horn, a modification of the skin, forming the nails, claws, hoofs, horns, scales, and beak covering of animals. Roughly speaking, horn is composed essentially of hair and glue. Assuming the hair to be the fundamental form of the appendage or modification, a nail would be regarded as a curtain or fringe of hair, the separate hairs of which lie parallel and are consolidated into one piece of thin, shell-like horn. When these consolidated hairs increase in length, that is to say, grow longer, we say the nail needs trimming. The hoofs of animals are to be regarded in the same light as the nails of a person's toes and feet. In other words, these horny defenses are

to be regarded as flattened, consolidated, that is to say, glued, hardened locks of hair. Likewise, the claws of a cat or dog or of a fowl are to be considered as tufts of hair which have become glued together and hardened into conical or variously shaped and curved pieces of horn. They are not bone; they have no more connection with the skeleton of an animal than the hair on one's head has. The hard, bony covering of a bird's bill is likewise to be looked upon as a tress of hair, or feather, the individual hairs of which in a glutinous mass have cohered and consolidated to form a thin, protective shell of horn, which gives the bill its stiffness and protects the tender portions within. The scales of the tortoise are said to be somewhat similar in origin. If what has been said of other horny coverings be true, it requires no great stretch of the imagination to believe that the scales of a fish are flattened, hardened, tufts of hair.

The horns of the ox, buffalo, bison, goat, and antelope are known as true horns, and are to be distinguished from antlers. The antlers of the deer, moose, reindeer and other animals of the deer family are not of horn but bone. They are true extensions of the bone of the forehead. A pair of soft processes or growths spring from the forehead and grow very rapidly into the shape of the future antler. At first they are exceedingly soft, and are charged with blood and covered with a soft fuzz called velvet. In a short time the living material supplied by the blood hardens into bone, when the velvet rubs off and the antlers are perfect. Antlers of this sort are shed each year, when a new and larger bony growth takes their place. Antlers are solid. True horns, like those of the ox and sheep, are hollow and permanent. Their base surrounds a living, pointed core that supplies materials for growth. The hollow horn can be regarded as a circle of hair which surrounds the core and has become consolidated into a continuous cylindrical horn. Viewed in this light, a curling ram's horn is merely a curling lock or tuft of hair growing out in front of the ear. Viewed as tufts of hair growing out stiff and straight, or waving in graceful curves or spirals, the horns of an animal have a peculiar tress-like appearance. The transition from a mass of cohesive hair into a hardened horn may be seen actually taking place on the head of the prong horn, a deer-like animal of the West, commonly, but, as we may see, wrongly, called an antelope.

See HAIR; FEATHERS; DEER; ANTELOPE.

Hornaday, William Temple, an American naturalist. He was born at Plainfield, Indiana, in 1854, and was reared on an Iowa farm. He was interested in animal life and made a special study of zoölogy. He has traveled, hunted, and collected extensively in the West; also in India, the Malay Archipelago, and South America. He has discovered a number of animals new to science, and has made valuable scientific collections. Among the larger animals that have fallen before his rifle are the elephant, tiger, orang, grizzly bear, puma, bison, buffalo, mountain sheep, goat, antelope, deer, elk, and moose. Perhaps no man living has made a more systematic or intelligent study of wild animals, birds, reptiles, and fishes in their native homes. He has never hunted for sport.

In 1882-90 he was chief taxidermist of the United States National Museum. Six years later he was appointed director of the New York Zoölogical Park, a position he still holds. Here he has supervised the collection and management of what is in many respects the most extensive and valuable collection of wild animals in existence. His administration is marked by extreme neatness. The animals are kept in the best of health; the premises are free from the offensive odors so unfortunately prevalent in many gardens.

Mr. Hornaday is well known personally all over the world. Not long since, he was called up at night by a messenger boy with a cablegram from the French Congo country, offering him a young elephant. He immediately cabled an acceptance. The elephant is now in the Park. Whenever he hears of a desirable animal and the funds of the Park do not permit its purchase, he applies to Mr. Carnegie or some other wealthy man, and never, it is said, in vain.

Mr. Hornaday has written a number of books, including *Two Years in the Jungle, Free Rum on the Congo, The Extermina-*

Common wryneck (Europe)

Bee-eater (Europe)

Toucan.

Paradise trogon (Central America).

Hornbill (Tropical Old World)

HORNBILL AND OTHER CLIMBING BIRDS.

tion of the American Bison, Taxidermy and Zoological Collecting, The Man Who Became a Savage, and *The American Natural History.* The last is far the best book of the sort for young Americans that has been written. We make room for two paragraphs from his incisive preface:

By natural inclination, every child is interested in animals. Whenever a grown person is not so interested, it is positive proof that the natural instincts of childhood either have been turned aside or stifled by lack of opportunity to live and grow. The love for animals is, I believe, even more universal than the love for music. . . . Students in the highest grammar-school grades, the high schools, normal schools, academies, and small colleges are so inadequately equipped for the study of natural history that fully ninety-five per cent of them, including also the great mass of students from the higher colleges and universities, enter active life ignorant of even the most important forms of the wild life of our own country! If this statement can be disproved, the author will be delighted to withdraw it, and apologize.

The interest taken by Mr. Hornaday in our wild animals is shown in the closing statements of a communication to *Collier's* for November 13, 1909:

We have no longer any wild bison, save one small band of about twenty.

The elk remains with us only in the Yellowstone region and the Olympic Mountains of Washington, plus a few individuals in a few other localities.

Antelope exist in widely scattered bands, to the number of about five thousand.

The big-horn mountain sheep is now rarely seen in the United States, and it is threatened with total extinction at an early date outside of the game preserves.

The mountain goat is not yet so rare in the United States as the mastodon, but wherever it may legally be hunted it soon will be.

The passenger pigeon is gone forever.

The heath hen (of Massachusetts) may be blotted out any year.

The pinnated grouse of the West now exists in a few localities only.

The splendid sage grouse is fast being shot off the cattle plains and soon will disappear.

The great whooping crane is very nearly extinct.

The trumpeter swan is so nearly extinct that skins are not procurable.

The California condor will last about twenty years longer.

The Labrador duck and great auk are quite extinct.

The "plume birds" of Florida are but little more than a memory; and so are the scarlet ibis, roseate spoonbill, and flamingo.

The fur seal has been reduced from four million to about thirty thousand only; and if the United States government does not quickly execute with Canada and Japan a new treaty, providing for it a ten-year close season, the species is doomed!

See BISON; SLOTH.

Hornbill, a peculiar bird of Africa and the Philippine region. There are several species. The bird is distinguished by an enormous bill resembling that of the toucan. The bill is surmounted in turn by a large horn or casque. The manner of growth may be comprehended by considering it a tuft of feathers changed into a horn. Despite its appearance the hornbill is said to be related to the kingfisher. It lives on fruit. The female nests in a tree after the manner of a woodpecker. When the hatching season arrives the male closes up the entrance to the nest with clay, leaving only a small aperture through which he passes in food to his mate.

Hornblende, or **Amphibole,** am′fĭ-bōl, a very common mineral of many varieties. The color is black or dark green for the most part, though almost any color may be found in some variety. Hornblende is found in granite, lavas, slate, and several other kinds of rock. Without a scientific examination of the specimen, it is hard to distinguish hornblende from similar minerals.

Hornbook, an old style English primer. It consisted of a sheet of paper or vellum pasted on a panel of wood and covered with transparent horn to prevent wear. The wooden frame was provided usually with a handle and was held like a hand mirror. When not in use it was hung by a ring from the child's girdle. The contents of the horn-book designed to instruct the infant reader showed first of all a large cross; then followed the alphabet in large and small letters. The vowels were printed in a line by themselves. Their combinations with the consonants, as b a, ba; b e, be; b i, bi; were given in a tabular form. A safeguard against evil spirits ran "In the name of the Father, and of the Sonne, and of the Holy Ghost." It was followed by the Lord's Prayer. Lastly came the Roman numerals. The writers of the Elizabethan Age, Shakespeare, Ben Jonson, and others, allude to the hornbook. Though each child in a dame school formerly had

a horn-book, specimens are now exceedingly rare and are among the choicest treasures of the museums.

Horned Toad, a lizard with spine-like scales and a stuffy, sluggish body, suggesting that of a toad. It is to be found from western Kansas to California and southward. A grotesque, harmless creature, chiefly of arid districts. There are eleven species, all companions of the cacti—horned lizards, they should be called. None are to exceed six inches in length. Mounted specimens are obtained readily through curio shops. See LIZARD.

Hornell, N. Y., a manufacturing city, on the Canisteo River, and on the Erie and the Pittsburgh, Shawmut & Northern railroads, is 93 miles southeast of Buffalo. It is situated in a fertile agricultural region. The principal manufactures are meat cutters, coffee grinders, silk, gloves, furniture, railroad supplies and the interior trim for buildings. It is the seat of St. Ann's Academy, St. James Mercy Hospital and contains a high school and modern graded schools. The water works are owned and operated by the city. The population was 15,025 in 1920.

Hornet. See WASP.

Horologe, hŏr′ō-lōj. See CLOCK.

Horoscope, that part of the heavens, or more strictly speaking, that part of the ecliptic, which is in the eastern horizon at the instant of one's birth. The term is also applied, and more frequently, to a diagram of the heavens by means of which the astrologer was able to determine what stars were in the horizon at any particular time. He pretended to have the power to read the future of a person the hour and date of whose birth was known. In the Middle Ages astrologers were present at the birth of a prince or heir to cast the horoscope; that is, to map out and announce the influence of the planets and stars present, as it were, at his birth.

Horse, a well known domestic animal allied to the wild ass, the zebra, and the quagga. The ancestor of our horse is not known, but it was probably a native of Central Asia where two species of swift, alert wild asses still exist. All these species are included in the scientific name *equus,* from which we have equine and equestrian. The horse, taken in this sense, is the only animal that steps on one toe. Its hoofs correspond to the nails of a person's middle toe and finger. The side toes have disappeared or are reduced to small, sliver-like bones, called splints. The use of one toe is regarded as advantageous on smooth, level land like the plains in which the horse naturally lives.

The petrified bones of prehistoric horses have been found in the more recent geologic formations of every continent except Australia. The evolution of the foot of the horse may be traced in these remains. In the specimens from the earlier rocks the front foot has four toes and the rudiment of a fifth; the hind foot has three toes and the rudiment of a fourth. In later fossils these rudiments disappear, leaving four and three complete toes. The next well-marked stage is that of three toes on each foot, the middle toe being larger and longer than the other two; then follow in regular series feet with the side toes just touching the ground, and side toes not touching the ground; then side toes smaller and smaller until we reach the modern horse with but one toe. In this connection it may be remembered that the foot of the ox has two toes on the ground and two short side toes hanging useless.

Some of these fossil horses were no larger than a rabbit, others were of the size of a gazelle. Both South and North America are rich in fossil horses. They have been found in South Carolina, Florida, Texas, Nebraska, Arizona, Kansas, and in the Bad Lands generally; but for some reason American horses became extinct. Our modern horses are all from the Old World. The wild horses of South America and the West are the descendants of horses brought over by the Spanish explorers and the conquerors of Mexico. On his second voyage Columbus brought horses to the West Indies. In 1527 the first horses in what is now the United States landed in Florida. In 1604 French horses were introduced in Acadia. In 1609 English horses were landed at Jamestown. In 1623 Dutch horses were brought to New Amsterdam, New York. The New England colonists introduced horses in 1629.

Among the European breeds to which

America is indebted are the Arabian and the Barb for the agile riding horses of the South. The shaggy, tough French Canadian horse is descended from the French Norman of an ancient type, to which we are also under obligations for the magnificent dapple gray draft horse of the present time. The Clydesdale draft horse, a large bay with shaggy fetlocks, is well known in this country. Local strains well known for their merits are the Kentucky-bred horse and the Morgan of Vermont.

In the earliest stages of settlement America had little use for horses. Settlements were made on the seaboard and travel was accomplished by water. The first fields were so full of stumps, and the early roads were so bad and so slow, that oxen were preferable. As the plantations extended, however, and roads and bridle paths were opened, the horse became more and more desirable and necessary. Without the pack horse the country west of the Alleghanies could not have been opened up. Without horses it would have been impracticable to displace the Indians from the Great Plains. The use of improved agricultural machinery and the enormous expansion of farming would not have been possible with the slow-going ox.

Steam and electricity, however, have come to the rescue of the draft horse. The locomotive now does our long hauling. The stationary engine has supplanted the horse power. The electric motor has relieved the horse from street-car duty. The automobile bids fair to take the place of the dray horse, and with the bicycle is driving the horse out of the livery stables. It is just possible that the day of the horse, like that of the camel, may at some time be of the past; but the time is yet far distant. At present the farms of the United States alone employ 15,000,000 work horses, a greater motor power than that used in all our factories.

Since the siege of 1870, horseflesh has been a popular article of food in Paris. It fetches about half the price of beef. Horse hide makes an excellent leather, suitable for razor strops, shoe uppers, and gloves. A fermented liquor known as koumiss is made from mare's milk. It is the favorite intoxicating beverage of the nomadic Mongolians of Central Asia. Horsehair is used extensively by the upholsterer.

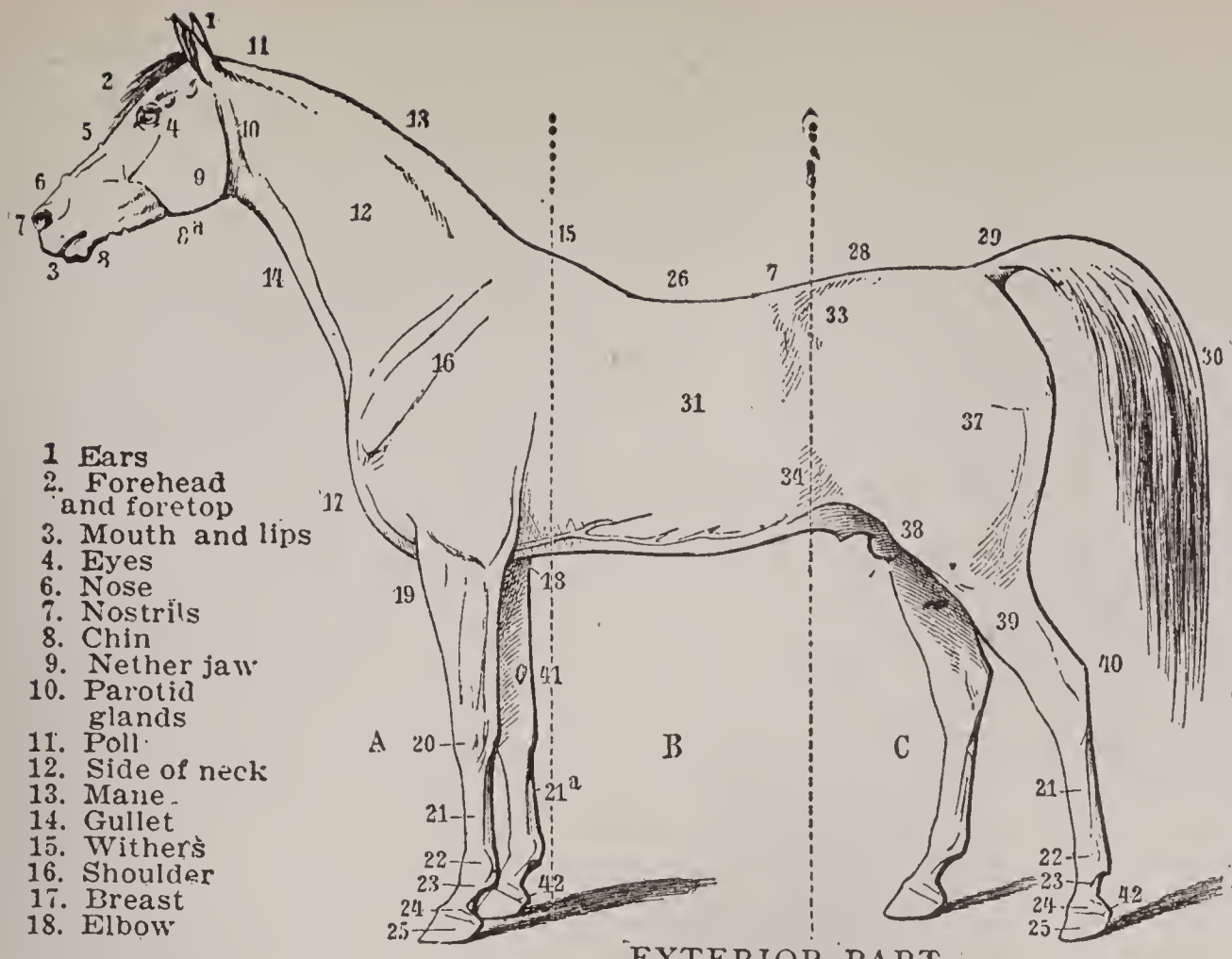
Some interesting statistics are culled from the United States census report. The large cities use from 4,000 to 5,000 horses per 100,000 inhabitants, being one horse for each twenty to twenty-five persons. The smaller the town, the more horses in proportion to the population. Iowa, Kansas, Illinois, Missouri and Texas have more than a million horses each, Texas being first with 1,187,000 in 1921.

On January 1, 1921, there were 20,183,000 horses in the United States, an increase of about two million head in twenty years. The United States was called upon to furnish horses to the allies during the World War, and exported 289,340 in 1915; 357,553 in 1916; and 278,674 in 1917. Since the latter year, however, exportation has dropped to less than thirteen million in 1921. The four most important horse markets in the United States are St. Louis, Chicago, Kansas City and Omaha, while of little less importance are Indianapolis, Sioux City, St. Paul, Cincinnati, Denver, Buffalo and St. Joseph.

The 1921 estimate of the number of horses on farms in some states of the Union besides those already mentioned is given in the following table:

States	Number
Arkansas	258,000
California	380,000
Colorado	408,000
Idaho	284,000
Indiana	591,289
Kentucky	420,000
Louisiana	211,000
Michigan	614,000
Minnesota	932,794
Mississippi	256,000
Montana	520,000
Nebraska	965,000
N. Mexico	225,000
New York	536,171
North Dakota	800,000
Ohio	795,000
Oklahoma	667,000
Oregon	276,000
Pennsylvania	539,957
South Dakota	786,000
Tennessee	338,000
Virginia	351,000
Washington	284,000
Wisconsin	674,000

According to the latest available statistics, some of the leading countries of the



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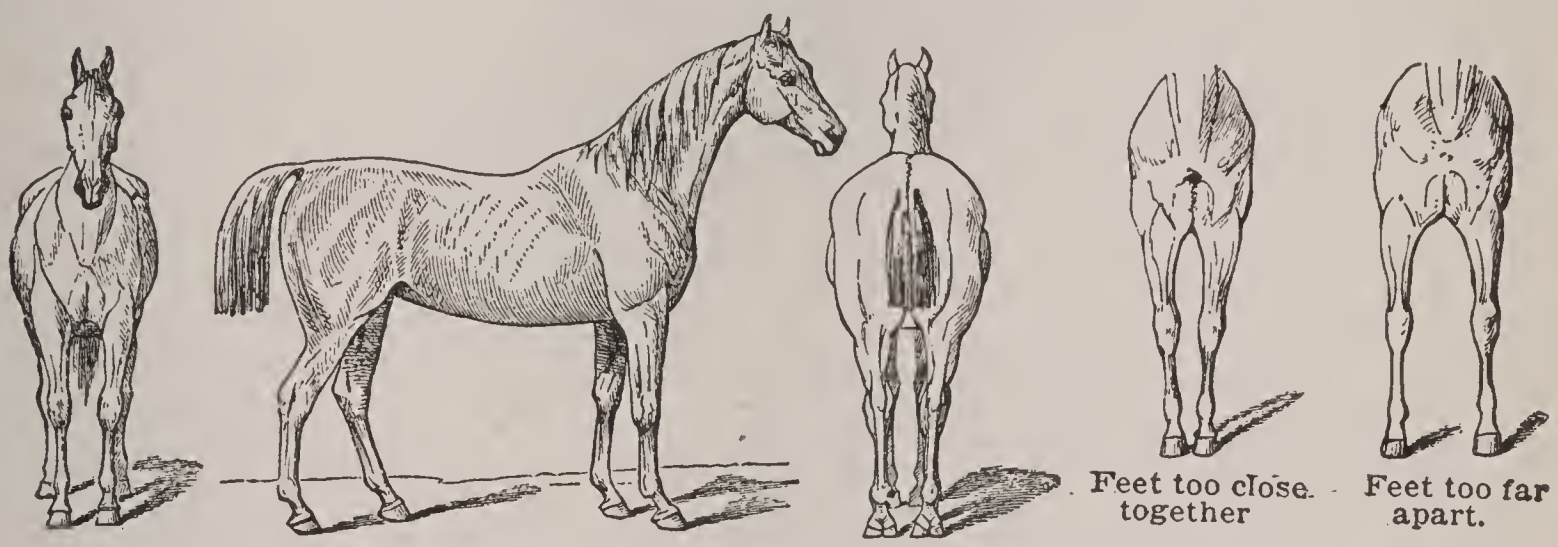


Front, side and rear view of the normal horse.

Feet too close together

Feet too far apart.

Legs forward.

Legs upright.

Legs too far back.

Knock kneed

Knee sprung.

Ankles too straight.

Flat footed like a bear.

Toeing out.

Toeing in.

THE HORSE

world exclusive of the United States had the following numbers of horses:

Country	
Great Britain	2,137,200
India	1,699,000
Canada	3,814,000
Australia	2,121,00
Argentina	9,366,455
Brazil	7,289,690
France	2,542,820
Germany	3,588,005
Russia	13,500,000

Horse-Chestnut. See BUCKEYE.

Horsefly. See GADFLY.

Horse Latitudes, a portion of the Atlantic Ocean which is near the Tropic of Cancer, and which is noted for the long duration of its calms. The name is also given to a region along the polar edge of the trade-wind belts.

The name arose, so the story goes, from the fact that ships sailing from New England to the West Indies freighted with loads of horses, through the long detention through calms in this region, had to throw the horses overboard, because they had died from lack of water.

Horse-Mackerel. See TUMMY.

Horsepower, literally, the power of a horse or the rate at which it can perform work. With the invention of the steam-engine, it became necessary for Watt to express its power in terms of the horse, and the standard he established has been generally adopted. So the horsepower became equivalent to the raising of thirty-three thousand pounds one foot high in one minute, or to the doing of work at the rate of thirty-three thousand foot pounds per minute. This somewhat exceeds the activity of an average horse except for limited periods. The determination of the horsepower of a steam-engine is a comparatively simple matter. Multiply together the area of the piston in square inches, the length of the stroke in feet, the mean effective pressure of the steam in pounds per square inch, and the number of strokes per minute, and divide the product by thirty-three thousand. It is customary to subtract ten per cent for friction.

The unit of power in metric units is the watt, named from the inventor, and is equal to doing work at the rate of one joule, or ten million ergs, per second. The kilowatt is of more practical size, and equals one and one-third horsepower.

Horse-racing, speeding horses for sport. The practice is of great antiquity. The Persians were familiar with the saddle. The Numidians rode madly without halter or bridle. The horse and his rider were well known to the Egyptians. Chariot races were held on the plains of Troy. King Solomon bought riding horses in Egypt, paying as high as $3,000 apiece. Horses were introduced into the Greek games as early as 648 B. C. The horse race was a regular part of the entertainment offered by the Roman circus. In *Ben Hur,* General Wallace gives a spirited account of a race according to the rules of a Roman circus.

Racing has been popular in Great Britain ever since the introduction of horses into the island. Regular season races were established as early as in the reign of James I. Cromwell had the reputation of being fond of a speedy horse. The Newmarket races were established in the reign of Charles II and have been kept up ever since. The Ascot races are held in Berkshire, and are patronized by the world of fashion. Races known as the Derby and the Oaks are run on Epsom Downs, near London. At the latter it is considered quite the proper thing for ladies to bet, not money, but dozens of Paris gloves. The English races are running races, each colt carrying its own jockey. No official records of time or distance are kept. The public demands a fair field and a bunch of running horses, and is satisfied when the best horse wins.

Running races of the English fashion were popular in the American colonies west and south of the Hudson River, especially in Virginia. As early as 1856 Americans began to cross the Atlantic to compete in the English races. In 1903 American horses started in 453 English races, winning first place in 74. The world's record was won by Salvator at Monmouth, New Jersey, in 1890—1 mile in 1 min. 35½ sec.

In America, however, the running horse has been replaced gradually by the horse driven in harness. Two gaits have been developed by the American driver—the trot and the pace. The trotting horse has what is called a diagonal gait. The left fore-

Burchell's zebra, South Africa.

African ass.

Mule.

Wild horse of the Cossacks, Russia.

MEMBERS OF THE HORSE FAMILY.

foot and the right hindfoot are lifted together. The pacer has a lateral gait, lifting the right forefoot and the right hindfoot at the same time. A thoroughbred is a horse with speedy ancestors on both sides for several generations. The blue grass, limestone region of Kentucky has been famous for the raising of fine thoroughbreds.

The famous American horses are descended from English strains. They are direct descendents chiefly of the celebrated English horse, Flying Childers, and a magnificent English Arabian, named Messenger. The former was bred by the Duke of Devonshire in 1715. He ran three and one-half miles at Newmarket in six minutes forty seconds, and for generations was considered the fleetest horse known. He won $1,000,000 in stakes and left half a thousand speedy descendants. Messenger was foaled in 1780 and was imported into this country. From him and a Vermont horse known as Justin Morgan, foaled in 1793, nearly all of our trotters are descended. The American race horse of today speeds in a driving sulky of marvelously light construction. It has ball-bearing axles and rubber tires. In trials of speed a sulky goes ahead with a canvas shield to part the air and another runs alongside to keep off any wind.

The United States holds the world's record for trotting and pacing horses. The lowering of the trotting records has proceeded from decade to decade and from year to year—at times being reduced but a fourth of a second. At the death of Messenger, in 1808, a mile in three minutes was regarded a marvelous record. Later, and for many years, 2:40 minutes was considered the limit. There are now in the United States a number of horses with a record of 2:10 and better. About one-third of these are pacers. The following table gives the best effort of a number of horses. The distance is one mile. The time is given in minutes and seconds.

Horse.	Year.	Time.
The Abbott, Terre Haute, Ind.	1900	2.03¼
Prince Albert	1902	2.00
Cresceus, Wichita, Kans.	1903	1.59¾
Lou Dillon, Memphis, Tenn.	1903	1.58½
Major Delmar, Columbus, O.	1904	2.08¼
Dan Patch	1906	1.55
Evelyn W., Columbus, O.	1912	1.57¾
Uhlan, Lexington, Ky.	1913	1:54½
Anna Bradford, Columbus, O.	1914	2.03
Directum I, Syracuse, N. Y.	1915	1.56¾
Russell Boy, Columbus, O.	1915	2.03¼
Lee Axworthy, Lexington, Ky.	1916	1.58½
Bertha McGuire, Toledo, O.	1918	2.04¼
Rifle Grenade, Columbus, O.	1920	2.04¾
Peter Manning	1920	2.04¾

Some famous derby records:

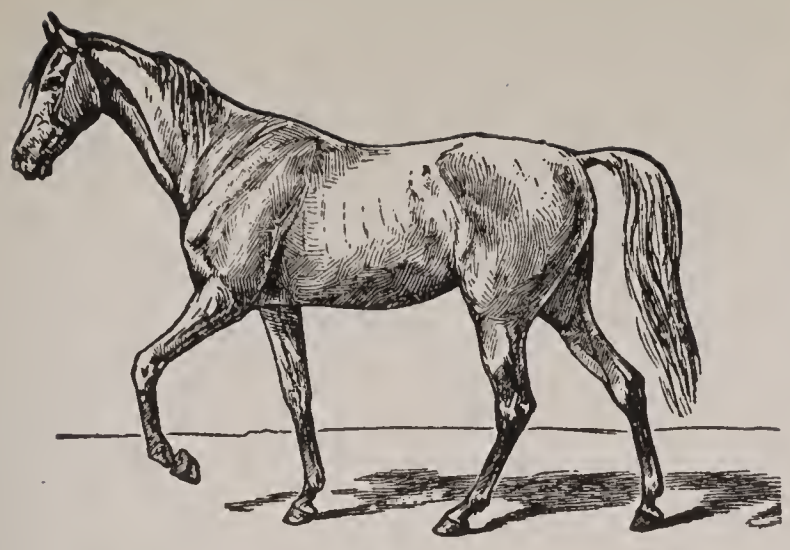
Gunfire	1903	1.38½
Irish Lad	1904	1.40
Grapple	1906	1.39
Glorifier	1907	1.40⅘
Jack Atkins	1908	1.38⅘
Fashion Plate	1910	1.37⅘
Whisk Broom	1913	1.39
Man O' War (3 miles)	1919	1.11¾
Wild Air	1920	1.38⅘
Mad Hatter	1921	1.37⅘

See BONNER; EPSOM; DERBY.

Horseradish, a member of the mustard family. It was introduced into American gardens from Europe. The root leaves are large. The flowers are inconspicuous. The seed pods are globular, but are seldom formed. The large, carrot-shaped, clustered roots, when grated and dashed with vinegar, are a well known accompaniment of boiled beef, ham, and other meats. The preparation of horseradish is of commercial importance. Gardeners devote large areas to its cultivation. The village of Baiersdorf in Bavaria, a few miles north of Nuremberg, has the reputation of producing the finest horseradish in Europe. Baiersdorf horseradish ranks with our Kalamazoo celery. Six million pounds, packed in barrels, are shipped annually.

Horseshoe Crab, a large crustacean that is also called king crab, and helmet crab. Four of the species inhabit the tropical regions of Eastern Asia. The American horseshoe crab is found on the eastern coast, from Maine to Mexico.

It is a large animal, nearly two feet in length, this including the caudal spine. The female buries her eggs in the sand and leaves them until the young hatch, which requires from a month to six weeks. The horseshoe crab makes its home in the mud and sand of shallow, quiet bays and estuaries, but never on the outer rocky shores of the ocean. Its food is shellfish and worms, which it comes across as it burrows in the soft sand and mud. It is found in



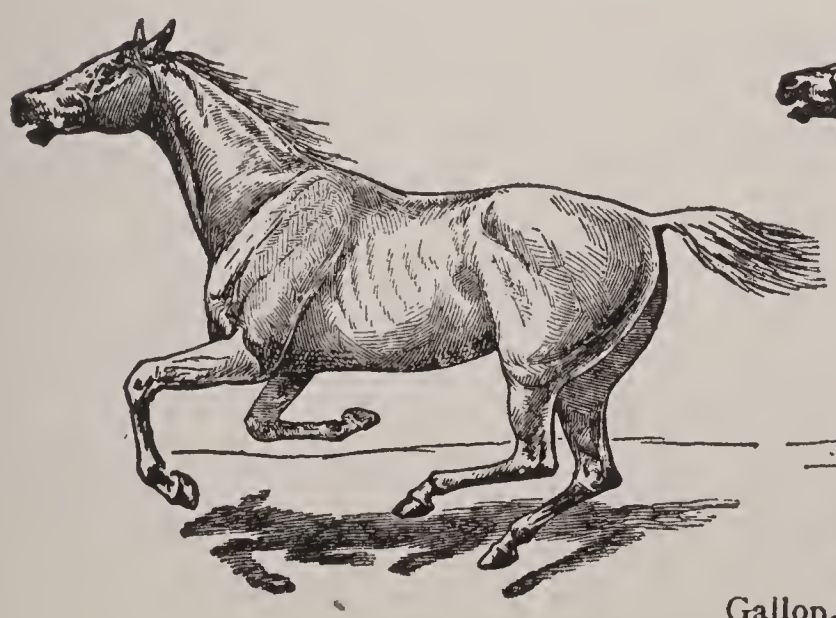
Walk.

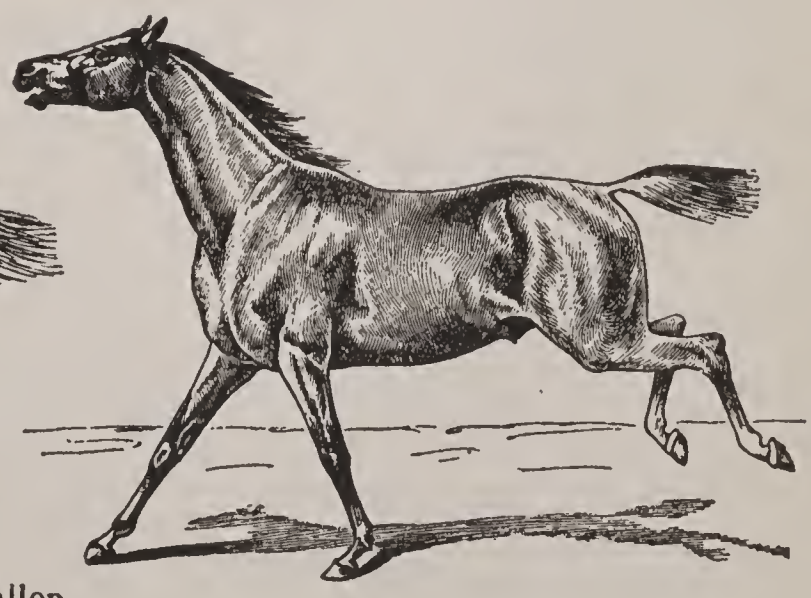
Pace.

Easy trot.

Round trot.

Canter.





Gallop.

GAITS OF HORSE.

large numbers in Delaware Bay and on the coast of New Jersey. After it is dried it is often used as a fertilizer. In some tropical countries it is used as a food. The horseshoe crab is also called casserole fish. from its resemblance to a casserole.

Horsetail Rush, a genus of cryptogamous plants, believed by some botanists to be a sub-order of ferns. The horsetail has a leafless, cylindrical, hollow and jointed stem, each joint ending in a toothed sheath, which encloses the base of the one above it. The fructification is at the summit of the stem in spikes which somewhat resemble cones, and are formed by scales bearing sporecases on their lower surface.

Horticulture, the cultivation of a garden. The term has outgrown its original limits and is now to be distinguished from agriculture only in a general way. The latter has to do with field crops. Bailey, the highest American authority, recognizes four branches of horticulture, namely: fruit growing or pomology, relating to the care of orchards; vegetable gardening for the home or market; floriculture, the raising of flowers, and ornamental plants; and landscape gardening. About 25,000 species of plants come within the range of American horticulture. About one-tenth of these are native. Our grapes, raspberries, dewberries, blackberries, mulberries, cranberries, some of our gooseberries, and several of our plums and apples have been developed from American varieties. Pumpkins, beans, and corn were raised by the Indians before the coming of the white man.

Hosiery. See KNITTING.

Hosmer, Harriet (1830-1908), an American sculptor. She was born in Watertown, Massachusetts. She showed skill in modeling in clay at an early age, and for that reason was given a course in anatomy at a St. Louis medical college. Her first work was a reduced copy of Canova's *Napoleon*. In 1852 Miss Hosmer studied in Rome under John Gibson, the English sculptor. Her most important works are Puck; Oenone, a life sized figure; ideal heads of Daphne and Medusa; statues of Beatrice Cenci, Zenobia, Lincoln, and Benton; the Sleeping Faun and the Waking Faun.

Hospital, a place for the reception and care of the sick and the injured. In its origin the term is closely related to hotel. Hospitals appear to have been unknown among the ancients. Little provision, if any, was made for the care even of the wounded on the field of battle. The Greek and Roman armies had no medical staff. The monasteries set apart a room for the sick. The modern hospital is an outgrowth of this custom. At the time of the English Reformation the monks were in charge of the hospital service of the kingdom. This branch of the monastery was retained in several instances and grew into a large establishment It became, we may say, fashionable for wealthy men to endow hospitals. In England a common term for both dispensaries and hospitals is "infirmary."

The ancient Greeks are said to have been treated by Aesculapius at Epidaurus. The early Jews had houses for healing, one of them being Beth Saida, spoken of in the New Testament. The growth of Christianity gave a great impetus to all forms of charity, and from the service of the monks in caring for the sick slowly grew the present admirable system of hospital work.

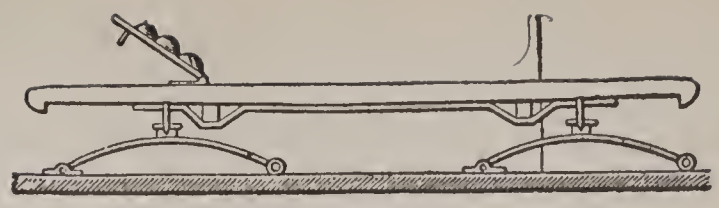
In nearly all large cities there are hospitals under the control of the city government, where those who are ill are treated and maintained free of charge until convalescent. Medical relief work is divided into two broad divisions: dispensaries and hospitals proper. The dispensary system is for the relief of patients who are temporarily, or not seriously, ill, and so are able to come to the dispensary for treatment, which may be free or for a fee. In most large dispensaries it is the custom to hold regular clinics, where patients who are treated free are utilized to instruct groups of medical students.

In the larger cities of the United States there are hospitals that are under the control of the city government and which are intended for the use of the city poor. Among these are the Johns Hopkins Hospital in Baltimore, the Philadelphia Hospital in Philadelphia, Bellevue and allied hospitals in New York, Massachusetts General and Boston City in Boston, Cook County Hospital in Chicago, etc. In ad-

FRUIT

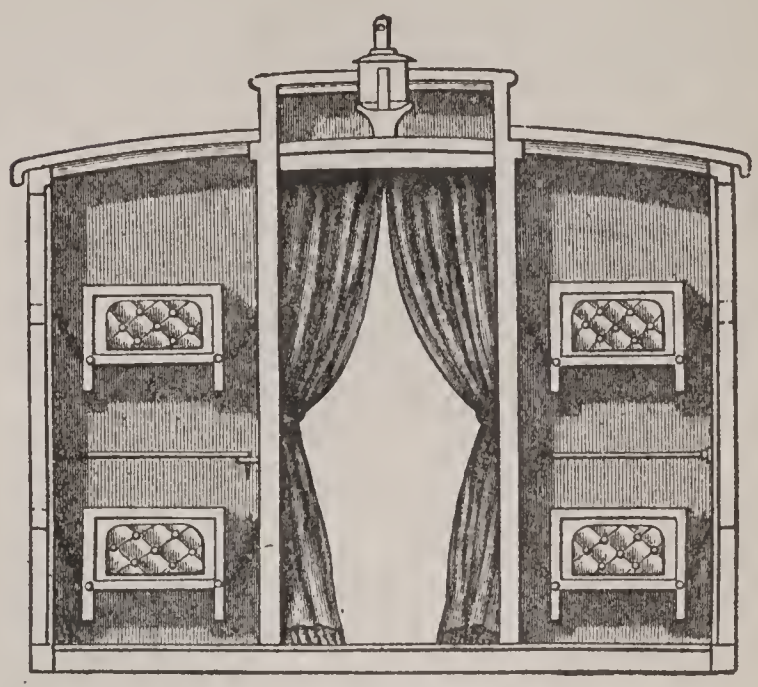
1, 2, 9 10. Currants
3, 4. Blackberries
5. Cranberry
6, 13, 21. Gooseberries
7, 8. Cherries
11, 12. Raspberries
14. Strawberries
15, 16. Plums
17. Apricot
18. Grapes
19. Peach
20. Apple
22. Pear

Prussian stretcher.

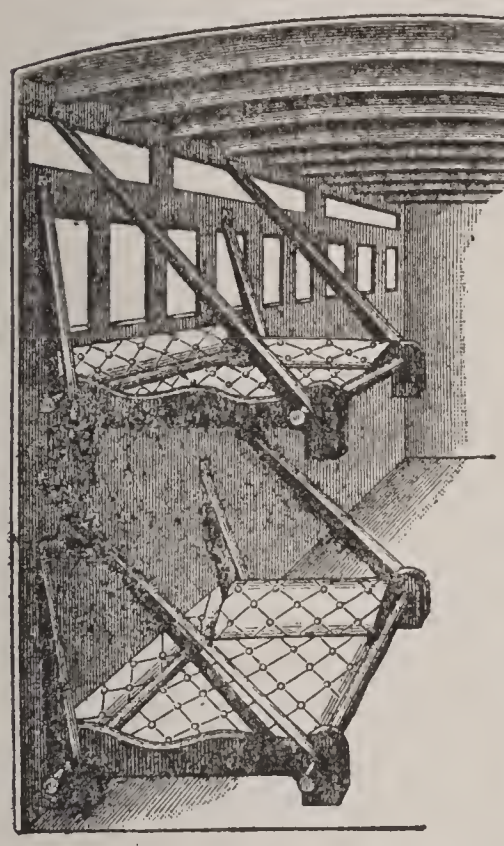


Cot.

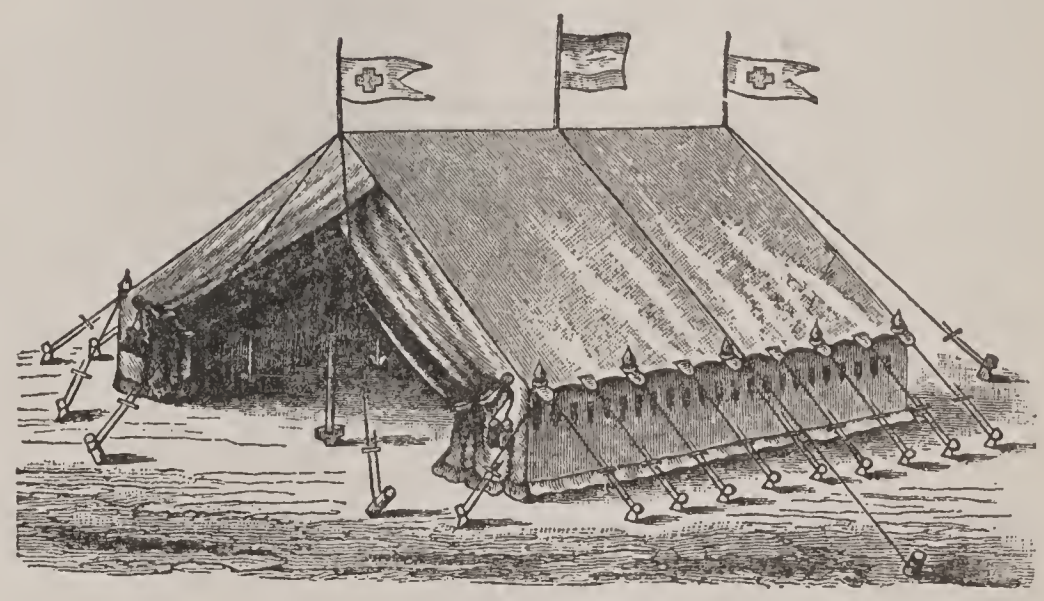
Handchair.



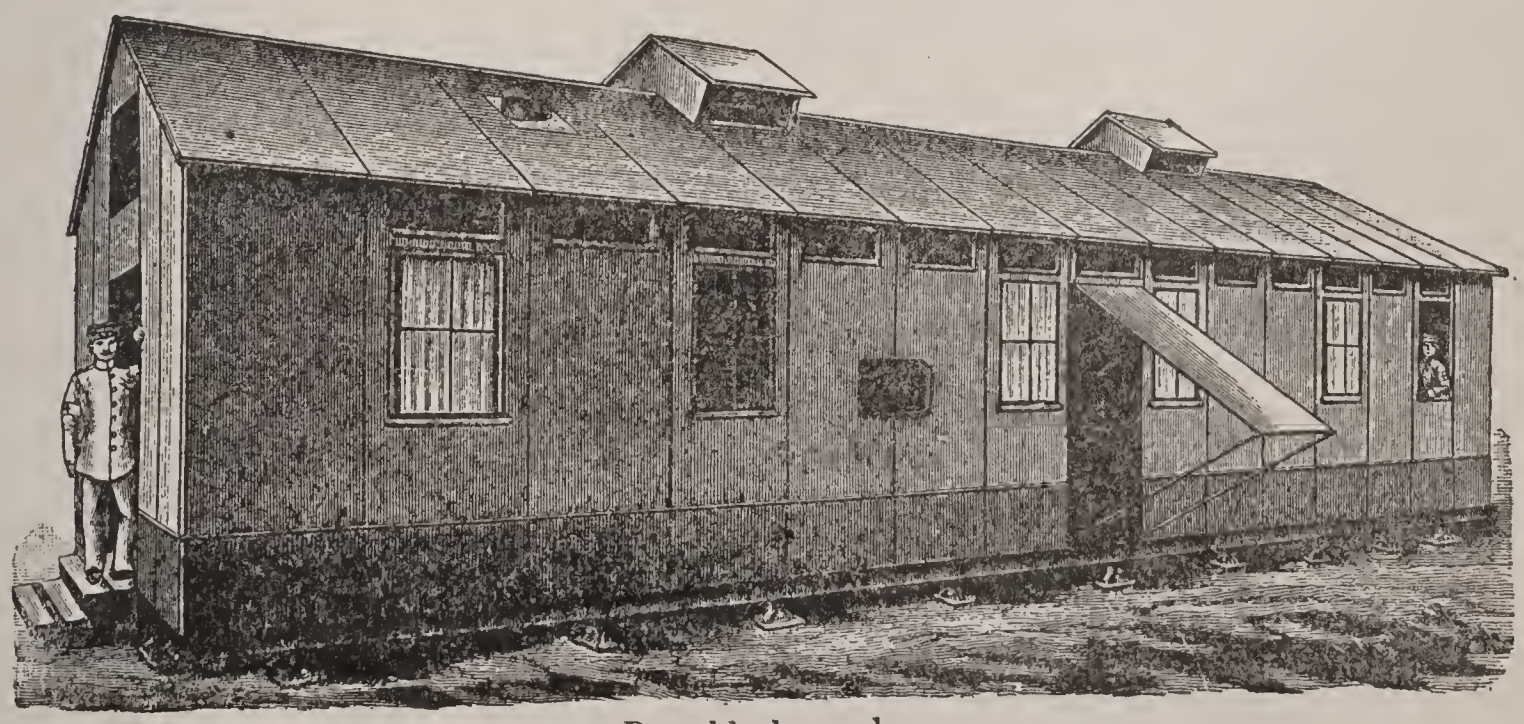
Ambulance car.



Berths.



Hospital tent.



Portable barracks.

HOSPITAL FIELD SERVICE.

York, the National and the Willard of Washington, the Continental of Philadelphia, the Ballard of Richmond, the St. Charles of New Orleans, the Planters and the Southern of St. Louis, and the Burnett of Cincinnati may be mentioned as some of the hotels of national reputation. The Fifth Avenue Hotel of New York City is credited with the first passenger elevator. In the larger American cities—New York, Chicago, San Francisco, Cleveland—hotels with more than a thousand guest rooms are not uncommon. These hotels are, of course, modern to the last detail, and the luxuriance of their appointment converts them into veritable palaces. Many summer and winter hotels in North America are larger than some of the best commercial hotels, but usually they are not as well constructed nor as finely appointed as are the latter, since they are only open for brief seasons and are not, therefore, as remunerative.

It has lately become customary for hotels in different cities to be associated under the same management or ownership, and thereby advertise each other. The most famous of these chains of hotels is the one that includes the Ritz-Carlton hotels of New York and Philadelphia, the Ritz of London, and other hotels on the European continent and in South America. The Statler hotels are well known in the United States, and in the South Atlantic states the Flagler system of tourist hotels on the east coast of Florida is popular. The most extensive chain of tourists hotels in Canada is the one owned by the Canadian Pacific Railway.

The so-called American plan of charging a flat daily rate for a room and meals is almost completely confined to Canada; while in the United States the European plan prevails. By this plan the guest pays only for his room, taking his meals where he likes; there is always, of course, a restaurant, or several restaurants, in a large hotel.

Hothouse. See GREENHOUSE.

Hot Springs, Ark., the county seat of Garland County, is one of the most beautiful cities in the United States, as well as one of the most famous health and pleasure resorts. From the side of Hot Springs Mountain, on the east of the city, flow 47 hot mineral springs. They are contained in an area of about 10 acres. These springs are owned and controlled by the United States government. The springs have been concreted and the water from them is conducted in pipes to bath houses and reservoirs. The water from the springs, used for drinking and bathing, possesses curative powers to a marked degree in cases of rheumatism, gout and many other physical disorders. The government has established a free bath house to which thousands annually resort for treatment. On Hot Springs Mountain the Army and Navy General Hospital is maintained. The hotels in this city are among the most palatial in the United States, and the itinerant population exceeds 100,000. Dunbar and Hunter, of the Lewis and Clark expedition visited the springs in 1804, and in 1807 a permanent settlement was made. The population was 11,695 in 1920.

Hottentots, a dark-skinned race in the extreme southwestern part of Africa. They are related to the Bushmen. Their language differs from that of the negro races. They are unlike the negroes, also, having a yellowish brown rather than a black complexion. The cheek bones are prominent. The lips are thick, the nostrils wide, and the nose flat. The hair is woolly and the beard scanty. When the Dutch and English settlers first invaded South Africa the Hottentots inhabited a territory of 100,000 square miles and numbered perhaps one-fifth of a million. Like the American Indians, they have been crowded away from the settlements. Their game has been destroyed. A remnant of 10,000 or 20,000 still exists. They have no fixed habitations, or, at best, live in miserable, low huts. They depend upon cattle rather than tillage for substance. See BUSHMEN.

Houdon, Jean Antoine (1740-1828), the greatest French sculptor of his day, was born at Versailles. He began work in his art at a very early age, and at twenty won the coveted Prix de Rome. Houdon studied in Rome for ten years, at the end of which he returned to Paris as instructor

at the School of Fine Arts. Among his finest works are the busts of Catherine II, Molier, Rousseau, Voltaire, Buffon, Lafayette, Napoleon, Franklin and Washington. To make the latter, which is now in the state capitol at Richmond, Va., Houdon accompanied Franklin to the United States in 1785. It is considered the finest likeness of Washington extant.

Hound. See DOG.

Hour-glass, a contrivance for measuring time. In making, the glass-blower closes a cylinder at each end, and draws the walls together to form a small passage or waist at the middle. When complete the glass has the form of two cones placed point to point. In use, as much sand or mercury is inclosed in one end as will run through the passage in an hour. By turning the glass the other end up, the passage of another hour can be marked, and so on. If a person were set to do a task, or wished to speak for an hour, the hour-glass reminded him of the passage of time, and also when his "hour was up." Its use gave rise to the expression, "the sands of time." The hour-glass continued in use for a long time after the invention of clocks. See CLOCK; WATCH; CLEPSYDRA.

House of Commons. See PARLIAMENT.

House of Lords. See PARLIAMENT.

House of Representatives. See CONGRESS.

Houseboat, a combination of a boat and a house. Taking a hint from the boat dwellings of eastern Asia, or possibly from the canal boat, the English originated the pleasure houseboat during the nineteenth century. It is a broad, commodious, comfortable affair, consisting of one or more rooms on a flat boat of shallow draft. It is quite popular on the Thames for families or small pleasure parties. Even wealthy people indulge in houseboat parties. Some of the boats are quite elaborate and expensive. They range in value from $100 to $25,000. The houseboat has been introduced into America. Long Island Sound and the Hudson, the St. Lawrence, the Ohio, the Mississippi, and other American rivers have their fleets of houseboats, which are brought into requisition during the summer months. At St. Louis and other cities enterprising proprietors have built theaters and other places of entertainment on boats. When the audience has come aboard, the boat pushes off for a cool spot, up or down the river, and returns after the entertainment is over. John Kendrick Bangs, a humorous writer, has utilized the idea in a fanciful description of *A Houseboat on the Styx.* The shades of Shakespeare, Dr. Johnson, and other worthies are the supposed guests.

Houston, hū'ston, **Samuel** (1793-1863), an American soldier. He was a native of Lexington, Virginia. When a boy he lived for a time among the Indians and was adopted by them. In 1813 he entered the ranks of the American army and served in the Creek War. Tennessee sent him to Congress in 1823 and made him governor in 1827. Two years later he resigned his office, left his family, and betook himself to the wilds of Arkansas to his former Indian friends, the Cherokees. Thence he drifted southward into Texas, and in 1832 he was made commander-in-chief of the Texan army. He moved upon Santa Anna's forces after the massacre of the Alamo. He fought the battle of San Jacinto, April 21, 1836. Santa was captured and the independence of Texas secured. Houston was made the first president of the new republic. He liberated Santa Anna and sent him to Washington, D. C. When Texas was admitted to the Union, Houston was sent to Washington as a senator. He was opposed to the repeal of the Missouri Compromise. He was elected governor in 1859, but upon the outbreak of the Civil War he was deposed for adhering to the cause of the Union.

Houston, a manufacturing city of Texas. The city has direct water connection through Buffalo Bayou with the Gulf of Mexico, fifty miles distant; this inlet has been widened and deepened by the government at great cost, and can be navigated by the largest ocean vessels. The city was named for General Houston. The people are progressive and public spirited; over $600,000 a year is spent on city government and schools. There are good public buildings, numerous churches, and a polytechnic institute founded by the late William Rice of New York.

Houston is important commercially because of the vast quantities of cotton, sugar, and rice for which it is a market. Besides its water traffic it is a railway distributing center for fruit, vegetables, and other commodities. The discovery of oil near the city has increased its manufactures which now include petroleum refineries, cotton-seed-oil mills, lumber mills, a car-wheel factory, breweries, and a furniture factory. The population in 1920 was 138,076.

Howard, Henry, Earl of Surrey (1517-1547). He was the grandson of the Earl of Surrey who won the victory at Flodden Field. He enjoyed the favor of Henry VIII for some years but after a time, being suspected of treason, he was imprisoned in the Tower, tried, condemned, and beheaded. Surrey was a friend of Sir Thomas Wyatt, and the two made a study of Italian poetry and borrowed therefrom the sonnet, which they adapted to English verse. Surrey was the first writer of English to make use of blank verse, translating two books of Virgil's *Aeneid* into this form of poetry. In 1557 the poems of Wyatt and Surrey were published in *Tottel's Miscellany.*

Howard, John (1726-1790), an English prison reformer. He was born near London and inherited considerable property from his father. In 1736, the year of the great earthquake at Lisbon, he set out to visit that city. His vessel was taken by a French privateer. Ere his release he underwent hardships in French prisons. In 1773 he was made sheriff, that is to say, a judge of his native county and devoted himself to the reform of prisons. He visited the chief prisons of Great Britain, Ireland, and the continent, and published an account of what he had seen. He died in the southern part of Russia from the effect of a fever caught from a patient. He was not a man of great ability, but he is remembered in England for his services in the cause of humanity.

Howe, how, **Elias** (1819-1867), the inventor of the American sewing machine. He was born at Spencer, Massachusetts, and died in Brooklyn, New York. His father was a farmer and a miller. Young Elias worked for his father on the farm and in the mill, and attended district school in the winter time. He learned the trade of a machinist. He patented his sewing machine in 1846. He visited England and took out a patent there. He was for a number of years poor, even destitute, and embarrassed by numerous lawsuits. About 1854 his rights under the patent were accepted by various manufacturers, who paid him a royalty, and he became a wealthy man. Nevertheless, he served as a private soldier during the Civil War, and, at a time when it was not known whether the general government was able to pay its debts, he invested his available money in United States bonds. By all accounts, he was a worthy, industrious, patriotic, inventive man. Howe was by no means the first to work at the general problem of a sewing machine, nor, indeed, was he the first to invent a possible contrivance. His inspiration came in the form of the thought to place the eye of the needle in the point, to thrust the thread through the fabric instead of drawing it after. With this idea in mind the rest was easy. See SEWING MACHINE.

Howe, Joseph (1804-1873), a Canadian journalist and statesman who was more influential than any other man in the establishment of responsible government in Nova Scotia. He was born near Halifax, Nova Scotia, learned the trade of painter under his brother, and at the age of twenty-three became editor and joint owner of a weekly paper, *The Acadian.* Mr. Howe soon acquired a reputation for intelligence and ability. A year later he became owner and editor of the *Nova Scotian,* which he edited until his election, in 1836, to the Nova Scotia assembly. In 1830 he began to write a series of *Legislative Reviews* in which he criticized unceasingly the governing body of Nova Scotia; he pressed home his charges of corruption until, finally, he was prosecuted for libel. The jury acquitted him in record time. After his election to the assembly he labored to realize all that he had advocated as editor, and was in large measure successful. During his political career he was speaker, secretary of state and premier of Nova Scotia, and was governor of that province at the time of his death.

Howe, Julia Ward (1819-1910), an American writer and speaker. She was born in New York. In 1843 she married Dr. S.

G. Howe of Boston. She joined her husband in editing the *Boston Commonwealth,* at that time the leading anti-slavery paper. While on a visit at Washington during the Civil War, she wrote a poem well known as the *Battle Hymn of the Republic.* After the close of the war Mrs. Howe engaged in the agitation for woman suffrage and prison reform. Mrs. Howe made many contributions to the papers and magazines and published several small volumes of poems. She is known to posterity, however, as the author of the poem already mentioned. It was set to the music of *John Brown's Body,* and was for a time very popular with the Union soldiers. The first stanza is as follows:

Mine eyes have seen the glory of the coming of the Lord;
He is trampling out the vintage where the grapes of wrath are stored;
He hath loosed the fateful lightning of His terrible swift sword,
His truth is marching on.

It is said that, on the evening before this hymn was written, Mrs. Howe was so oppressed with the thought of the war, so troubled and anxious over the outcome, that she was unable to write. As she slept that night the poem took shape in her mind so clearly that on awakening she was able to write it immediately and in almost the exact form in which it was published.

Howe, Richard, Earl (1725-1799), a distinguished British naval officer, was born at London. He began his naval career while very young, and at the age of twenty was in command of the *Baltimore.* This ship was engaged by two French privateers in 1745, and the young commander was seriously wounded. During the War of the Austrian Succession and the Seven Years' War, Howe saw active service and rose steadily in rank; and when the American Revolution began he was given full charge of the British fleet in American waters. He was made First Lord of the Admiralty after the Revolutionary War, and commanded the Channel Fleet during the war between England and France. Three years before his death he was raised to the rank of admiral.

Howe, Sir William (1729-1814), a British military officer, was the younger brother of Richard Howe. At the age of seventeen he saw service in Flanders. He fought during the last French and Indian War, and succeeded General Gage as commander of the British army in America. Before the opening of the American Revolution, Sir William had returned to England, where he served in Parliament. Three years before the Revolution, he was made major-general, and in 1775 was sent to the relief of Gage at Boston. His first engagement after the Revolutionary War began was the Battle of Bunker Hill; it was after this battle that he was chosen to succeed Gage. He commanded successfully at the battles of Long Island, White Plains and Brandywine, but could not realize his hope—the crushing of the Revolution. He was succeeded by Sir Henry Clinton in 1778, and though his activities after his occupation of Philadelphia had led to an investigation, he was not reproved. After his return to England, Sir William was made full general.

Howell, Clark (1863-), an American editor and publicist, a director of the Associated Press and editor of the Atlanta *Constitution.* He was born at Erwinton, S. C., and was graduated from the University of Georgia in 1883. Mr. Howell at once went into newspaper work under his father on the *Constitution,* of which he became editor-in-chief upon his father's death in 1897. From 1886 to 1891 he was a member of the Georgia house of representatives, and a member and president of the Georgia senate during 1900-06. Since 1892 he has been a member of the Democratic National Committee. Mr. Howell is well known in the South, where he has taken a large part in many political campaigns, and where he has won an enviable reputation as an orator.

Howells, William Dean (1837-1920), an American poet, novelist, and literary critic, born at Martin's Ferry, Ohio. The son of a newspaper man, young Howells was a compositor at fourteen, a correspondent of the *Cincinnati Gazette* at nineteen, and news editor of the *Ohio State Journal* at twenty-two. He published poems now and then in the *Atlantic Monthly,* brought out a small volume of poetry, and, on

Lincoln's nomination to the presidency, wrote his life. In 1861 Howells was appointed United States consul to Venice, where he remained for four years. He has since been connected with the *New York Times,* the *Tribune,* and the *Nation;* has filled the position of editor-in-chief of the *Atlantic Monthly;* conducted the critical department of *Harper's Monthly;* and has written more than twenty novels, several farces, and two or three volumes of poetry, besides critical essays on literary subjects.

His best novels include *A Chance Acquaintance, The Lady of the Aroostook, A Modern Instance, The Rise of Silas Lapham, Indian Summer, April Hopes, Their Wedding Journey, The Quality of Mercy, A Hazard of New Fortunes, A Foregone Conclusion.* His farces, *The Parlor Car, The Mouse Trap, The Elevator,* and *The Albany Depot,* are amusing and pleasing. *Venetian Life* and *Italian Journeys* record the impressions of his life in Europe. Howells' first novel, *Their Wedding Journey,* possessed an almost idyllic charm; but Howells soon became a realist, bent on presenting life as he saw it. He claims that neither plot nor action, neither hero nor heroine, are necessary to a story. His novels are not exciting, and his characters are commonplace. They are natural, however, and the conversations which crowd his pages are for the most part bright and entertaining. The moral tone is always pure and elevating, and the vein of irony which runs through most of his stories adds spice to what might otherwise grow monotonous.

Howells is regarded as the founder of the realistic school of writers in America. The influence of his theories has been wide and powerful. His novels, however, have appealed to the popular taste as some one says through "qualities quite independent of his theories."

Howitt, William and Mary, two English authors whose names are appropriately mentioned together. William Howitt (1792-1879) was of Quaker parentage. He was born at Heanor, Derbyshire. He early showed a taste for literature, publishing verses at the age of thirteen. In 1823 he married Mary Botham (1799-1888) a lady of intellect and literary acquirements. Together they published several volumes of poems in which Mrs. Howitt's work is the more worthy of note. Mr. Howitt's best prose works are those which treat of English history and scenery. *The Book of the Seasons, Rural Life in England, Visits to Remarkable Places,* and *Homes and Haunts of the British Poets* are among them. The couple lived for some years in Germany, where Mr. Howitt wrote *Student Life in Germany,* and *Rural and Domestic Life in Germany.* Mrs. Howitt translated the stories of Frederika Bremer, the Swedish novelist, and those of Hans Christian Anderson. She also wrote *Tales for Children* and many poems. Her stories and children's poems were popular both in England and in the United States. None of these is more widely known, probably, than *The Spider and the Fly:*

"Will you walk into my parlor?"
Said a spider to a fly;
"'Tis the prettiest little parlor
That ever you did spy.
The way into my parlor
Is up a winding stair,
And I have many pretty things
To show when you are there."

Howitzer, a short piece of artillery, usually having a hemispherical chamber for the powder narrower than the bore, specially designed for the horizontal firing of shells with small charges, and combining in some degree the accuracy of the cannon with the caliber of the mortar, but formerly more portable than either. Howitzers were developed to a large size and power during the World War of 1914-18, and Germany used 11-inch mortars, weighing 15 tons, in the reduction of the forts at Antwerp and elsewhere.

Hoyle, hoil, **Edmund** (1672-1769), a London barrister. Little is known of him save that he was an expert in all matters pertaining to cards and other games. In 1742 he published a *Short Treatise on Whist.* Compilations of rules and instructions for playing various card games, dominoes, checkers, chess, etc., are still sold under the name of *Hoyle's Games.* Many recognize this book as an authority, hence the expression, "according to Hoyle," has become proverbial. See GAMES; SPORTS.

Hub of the Universe, a term applied facetiously by Holmes to the city of Boston.

Hubbard, Elbert, (1859-1915), an American writer and publisher. Bloomington, Illinois, was his birthplace. His education was received in the common schools and at Harvard College, from which he was not graduated. As a young man he was both journalist and manufacturer, showing marked ability as both. After selling his business he spent some time in study and travel, then settled down in 1883 at East Aurora, New York. There he built up "The Roycrofters," a unique establishment where beautiful things are made by hand,—books, tables, and pottery are some of them. Though it is purely a business enterprise, "the management," as Mr. Hubbard said, "unlimbered the Golden Rule." The workshops are very homelike, with fine pictures on the walls and a piano in the corner. No certificate of character is required of an employee; the only requirement is that he "work as good as he can." The name Roycroft is borrowed from an old English bookmaker of the sixteenth century.

Mr. Hubbard was the publisher of *The Philistine, a Magazine of Protest,* and *The Fra,* the organ of the Roycroft society. *A Message to Garcia,* his pamphlet which had so wide and sudden a sale, was first published in *The Philistine.* A series of books which embraces *Little Journeys to the Homes of Great Musicians, Little Journeys to the Homes of American Statesmen, Little Journeys to the Homes of Good Men and Great,* and others, is very popular. Other of Mr. Hubbard's writings are *The Legacy, Forbes of Harvard, A Tale of the Prairies, and Time and Chance.*

He met his death as one of the victims of the ill-fated "Lusitania."

Huberdeau, Gustave (1878-), a noted French basso, was born in Paris. He entered the Paris Conservatory at the age of 17, where he studied violin, theory and singing. During the term of his studies he received many prizes. He made his first appearance on the operatic stage at the Opéra Comique in Paris, in the *Barber of Seville* in 1898, remaining at this institution for ten years. He was then engaged to sing in New York City at the Manhattan Opera House. He sang here for two years, after which he joined the Chicago - Philadelphia Opera Company. He created the rôle of Orestes in the *Elektra* of Richard Strauss. He has a voice of wide range, power and flexibility. In addition to this, he is a very fine actor, and is of striking appearance.

Huckaback, a species of toweling of either cotton or linen, woven with a honeycomb surface and finished either in white or in the natural color. Huckaback or huck, as it is frequently called, is durable and satisfactory on account of its frictional surface. The fine linen qualities are often embroidered and make handsome towels, while the cheaper grades are desirable for rough usage. The name huckaback is supposed to be a corruption of hucksterback, which term in early times signified "peddler's ware."

Huddersfield, England, an industrial center for the manufacture of cloth and woolens, 16 miles southwest of Leeds. It is situated on the Colne, and has excellent canal and railway connections. Other important manufactures are silk, iron and machinery products. Coal mining and stone quarrying are also important factors in the industrial life of the town.

Huddersfield is an old city, in its early days being known as Odersfelt. However, it did not become important until the beginning of the 18th century, when extensive woolen mills were established here.

Its municipal government is admirable, and as early as 1853 it was a pioneer in many economic features for the betterment of the workers, such as artisans' dwellings, for married couples as well as for bachelors and single women. Huddersfield was the first English city to own and operate its tramways, and now all its public utilities are under the control of the city. It has beautiful parks, libraries, an art gallery, public baths and wash houses, hospitals, splendid schools, and, in a word, is distinctly modern. It was the first town to adopt an eight hour working day. There are a few fine old buildings here, which date from an early period, also a college which is affiliated with the University of London. Huddersfield is also a county and parliamentary borough. Pop. 110,120.

Huckleberry, a berry-like fruit containing ten seed-like nutlets. There are several species of huckleberry shrubs bearing fruit very similar to the blueberry. The common huckleberry of the markets is black and without bloom. It grows on much branching shrubs from one to three feet high, found in low places and swamps from Newfoundland to Minnesota, and south along the mountains to Georgia.

Hudson, Henry, a distinguished English navigator. Nothing is known of his boyhood or youth. His known history begins with 1607. In that year he was sent out by a trading firm, the Muscovy Company, with a ship of sixty tons, the Hopewell, and a crew of ten men and a boy, in search of a passage to Asia by way of Greenland. The next year he made another attempt to reach Asia, that is to say, China, sailing this time around Norway by way of Nova Zembla. As the natural result of these voyages, the Muscovy Company established a profitable trade with Spitzbergen, and the foundation of the English whale fisheries was laid.

Hudson was not satisfied that it was impossible to reach China by a northern pass. He went to Amsterdam. In 1609 the Dutch East India Company sent him out with the Half Moon and a crew of twenty men. May 5th found him in the Arctic Ocean. Failing to find passage, he sailed south along the coast of North America, using a map sent him by his friend Captain John Smith. He was in mind to explore the Chesapeake, thinking that it might lead through North America to the Pacific Ocean. September 3rd, he entered what is now known as New York Harbor and sailed up the Hudson River as far as Troy, until he became satisfied that there was no outlet to the China Sea in that direction. He traded with the Indians and started for home. On his way to Amsterdam he put in at Dartmouth, England, where his ship and crew were seized by the English government.

In 1611 he was sent out by England. With a ship of seventy tons he attempted the northwest passage again. He entered the long straits that lie between Greenland and the main continent, discovered the great bay that bears his name, and wintered at its southern extremity. In the spring of 1611 he started home. A rumor having gone abroad among his men that, owing to shortage of provisions, Hudson intended to leave a part of the crew at some convenient point, a mutiny arose. Hudson, his son, and seven of his men were put into a shallop and sent adrift. The ringleaders and many of the crew perished miserably, but the ship finally reached London. The following season a ship was sent out in vain search for Hudson. Without doubt he and his companions found their graves in the vast body of water that bears his name. He was evidently an enthusiast, not unlike Columbus. His life was lost in trying to carry out a great idea. The passage he sought was not traversed until 1905.

In 1909 a Hudson-Fulton celebration was held at New York. The opening day was marked by a Hudson River pageant. Faithful copies of the Half Moon and the Clermont were escorted by a line of ships fifteen miles long. The column included 1,000 vessels, varying in type from the one-man catboat to the mighty British cruiser battleship, *Inflexible.* There were fifty-seven warships, representing the navies of the United States, Great Britain, Germany, France, Italy, Holland, Mexico, and Argentina—450,000 tons of steel, bearing 28,000 officers and men and armed with 1,897 guns; 120 steamboats and ferry boats, seventy-five steam yachts, seventy-five motor boats, 300 tugs and steam lighters, 400 sailing craft and small launches. It is believed that 5,000,000 persons viewed the parade from the shores of Brooklyn, Manhattan, and New Jersey.

Hudson Bay, an inland sea of Canada. It is one of the largest inlets of the ocean known. The greatest extent from north to south is about 800 miles. The greatest breadth is 600 miles. The sea is open to ships from the middle of June to the end of October. At other seasons it is obstructed by cakes of floating ice. There are excellent fisheries. The right whale is taken in its waters. The eastern shore is rocky and precipitous. The western shore is low and swampy. It is believed that large areas adjacent to the bay, especially on the southwest, may one day be converted into a valuable dairy and stock country; but as yet

there are only a few villages on its shores occupied by the fisher and the fur trader.

Hudson's Bay Company, a fur-trading company of British North America. Two Frenchmen, who were dissatisfied because the French fur traders would not extend their operations into the Hudson Bay country, succeeded in gaining the attention of a London trading firm. Prince Rupert, a cousin of King Charles II, took up the matter and brought home a cargo of furs from Hudson Bay. In 1670 he secured a charter for himself and seventeen associates, running "to the Governor and Company of Merchants-Adventurers, trading into Hudson's Bay." The king granted this company a monopoly of the right to trade in that region, authorizing it to expel rivals, to build forts, maintain ships of war, to declare war and to make peace with non-Christians, that is to say, the Indians. The capital of the company was $52,500, divided into thirty-five shares.

The company built a number of forts and established a profitable trade. The early dividends averaged forty per cent per annum, but the total volume of business was small in comparison with that carried on by the French fur traders of the St. Lawrence. The operations of the company were hindered and large losses were inflicted by various intercolonial wars. During the war of the Spanish Succession the company declared that a half a million dollars' worth of its property had been destroyed. When France ceded her North American possessions to England the business of the company was greatly enlarged, and it became exceedingly wealthy. In 1784 a company of Scotch merchants started a rival concern, the Northwest Fur Company, headquarters at Montreal. These companies did each other all the harm they could, sinking each other's canoes, destroying each other's forts, inciting Indian massacres, and coming into actual conflict at arms. In 1821 they were consolidated.

Parliament adopted the policy at this time of making the company land grants, so that it became not only a fur-trading and military company, but a landowner. Vancouver Island was granted. At this time the company employed 513 men and thirty-five officers. A few years later there were over 3,000 employes and officers with 152 trading posts. In 1859 the right of the company to a monopoly of trade expired, but it was too well intrenched to permit successful rivalry. It was also a large landholder. The Dominion of Canada desired to introduce settlers, a project quite at variance with the views of fur traders. The company held that powers of government granted in the original charter could not be taken away, and that the company had the right to forbid the entrance of settlers into its fur-producing territory. The government felt that the rights of the company ought not to be permitted to frustrate plans for the settlement and development of the country. A compromise was arranged in 1869. The company transferred all its right of government to the Dominion of Canada. The Dominion gave the company $1,500,000 and a grant of one-twentieth of all lands which might be set out for settlement. These lands are held under a title similar to that by which a railroad company holds a grant.

The company is far from extinct. It maintains about 200 factories, or fur-buying stations, stretching from Labrador westward to British Columbia, and northward to the borders of Alaska and the Arctic Ocean. A regular mail route is maintained, extending from Edmonton northward through the Mackenzie region. The lands of the company have been placed on the market, and are bringing in large sums of money. It is still the largest fur company in the world and it exports about one-half the furs sent from Canada. The central office is still maintained in London. See MACKENZIE; FUR.

Hudson Bay Railroad. See CANADA. Subtitle *Transportation.*

Hudson-Fulton Celebration. See HUDSON, HENRY.

Hudson River, one of the noblest rivers of the United States. It rises in the Adirondack Mountains. As soon as it has been joined by several small headwaters, it takes a course nearly due south to New York Bay. At Troy it receives the Mohawk, a larger river than itself. Above Troy the current is rapid. At Glen's Falls there is a cataract fifty feet in height. The lower part of the Hudson occupies a drowned

valley. The tide ascends almost as far as Troy. From Troy to New York Bay, a distance of 145 miles, the descent is but five feet. The lower 100 miles of the river is noted for impressive scenery. It has been compared with that of the Rhine. At Haverstraw the Hudson expands into Tappan Bay, about twelve miles in length and four or five in width. The Catskill Mountains, well described by Washington Irving, rise on the west. Below Tappan Bay the western shore rises precipitously from 300 to 500 feet. This wall extends for about twenty miles. It is known as the Palisades.

Huerta, Victoriana (1857-1915), Provisional President of Mexico, 1913-14. He came of aristocratic parentage. In 1877 he graduated from the military school of Chapultapec and joining the army, was so successful in putting down brigands that President Diaz made him head of the department of Geographic Survey. With the overthrow of Diaz he became a supporter of Madero and was made commander-in-chief of the army. In February, 1913, he joined the younger Diaz in the overthrow of Madero. As Provisional President he was not recognized by the United States and as a result of great pressure left for Spain. Later he returned to the United States where he was arrested because of a plot to invade Mexico. He soon after died.

Hugh Capet (939-996), king of France from 987 to 996, was the son of Hugh the Great, Count of Paris. Succeeding his father as Count of Paris in 956, Hugh Capet thereby became the real ruler of the country even though the title of king still belonged to the Carolingians. When Louis V, last of the Carolingian kings of France died without heirs in 987, Charles, Duke of Lorraine claimed the throne by descent. But at a meeting of the nobles and prelates of the realm, the crown was declared to be elective, and Hugh Capet was chosen king. He became at once the first French king of France and the founder of the famous Capetian dynasty, which gave to Europe 118 sovereigns.

Hughes, Charles Evans (1862-), a prominent American lawyer, public official, and jurist, Governor of New York for two terms, unsuccessful nominee for the Presidency of the United States, and the Secretary of State in President Harding's cabinet. Mr. Hughes was born at Glens Falls, N. Y., and educated at Colgate and at Brown universities, and at Columbia Law School. From 1884 to 1891 Mr. Hughes practiced law in New York. In 1891 he was appointed professor of law at Cornell University. He resumed practice in 1893. In 1905 Mr. Hughes was appointed special attorney by the New York Legislature to investigate the financial methods of the powerful life insurance companies of the state. The result of his skilful and thorough investigation was the awakening of public opinion and many radical reforms. In 1906 Mr. Hughes was elected governor of New York, defeating William Randolph Hearst, his opponent, by 60,000 votes. In 1908 he was re-elected governor. During his administration Mr. Hughes strove unceasingly for reform. Due to his efforts, the Public Service Commission Act was passed, the race tracks of the State were closed, and the Direct Primary Bill was belatedly but finally passed in 1913. President Taft appointed Mr. Hughes Associate Justice of the Supreme Court of the United States in 1910. Upon his nomination for President of the United States in 1916, Mr. Hughes resigned his judicial position, but after his defeat returned to law practice in New York City. In 1921 he was commissioner plenipotentiary for the United States at the International Conference on the Limitation of Armament which met at Washington, D. C.

Hughes, James Laughlin (1846-), a distinguished Canadian educator, was born near Bowmanville, Ontario, and educated at the Toronto Normal School. Mr. Hughes began his career as a public school teacher, and from 1867 to 1871 was an instructor at the Model Training School, Toronto. During 1871-74 he was principal of the Toronto Normal School, and inspector of Toronto Public Schools from 1874 to 1914. In everything pertaining to education in Ontario, Mr. Hughes has always taken a conspicuous part. For a time he was chairman of the Executive Committee of the National Educational Association, and he served on numerous other edu-

cational commissions. He is the author of several authoritative books, among which are *Mistakes in Teaching, Equal Suffrage* and a *Topical History of Canada.*

Hughes, Sir Samuel (1853-1921), a Canadian soldier and statesman, was born at Darlington, Ont. When 13, he jointed the Canadian volunteer militia, and saw service in 1870, at the time of the Fenian raids. In 1897 he was made lieutenant-colonel and given command of the 45th regiment. He was educated at the Toronto Normal School, Toronto University, and at the Royal Military School. For a time he was a teacher in the public schools, and from 1875 to 1885 was lecturer on English literature and language in the Toronto Collegiate Institute. After this he engaged in newspaper work and became editor of the Lindsay *Warder.* In 1897 Hughes visited Australia and New Zealand to seek colonial assistance in imperial wars, and on the outbreak of the South African War served therein from 1889 to 1900, in 1902 being promoted colonel. In 1892 he was elected to the House of Commons. On the defeat of the Laurier administration in 1911 he became Minister of Militia in the Borden cabinet. Upon the outbreak of the European War, Hughes was foremost in organizing Canadian troops for the assistance of Great Britain, and was the creator of the overseas force, the first contingent of 33,000 being sent in 1914 and another 20,000 in 1915. In 1915 he was created K. C.B. and promoted major-general. Hughes was also active in the movement for an increase of 50,000 to the Canadian armed force, nearly all of the latter remaining in Canada for home defense. During his incumbency as Minister of Militia, he was responsible for the organization of a Canadian army of 400,000 men. He was a courageous and resourceful soldier, and although he took a keen interest in the public affairs of his country, his interest lay cheifly in the improvement of the spirit and efficiency of the militia. Sir Samuel retired from military life in 1916.

Hughes, hūz, **Thomas** (1823-1896), an English writer and statesman. He received his education at Rugby and Oxford, and was admitted to the practice of law. He entered Parliament as a Liberal of advanced views. He was a friend of Canon Kingsley. In 1880 they together attempted the establishment of a socialistic community called New Rugby in the mountains of Tennessee. The members were sons of English farmers, but the undertaking was not a financial success. Hughes wrote many articles for periodicals and the London press. At the time of the Civil War he was much interested in the liberation of the American slaves. He formed a strong friendship with James Russell Lowell. Hughes was a useful man who deserves to be remembered for public services, but his fame rests largely on a book for boys entitled *Tom Brown's School Days.* It is understood to be an account of his boyhood life at the celebrated grammar school at Rugby, of which Dr. Thomas Arnold was the head. Its success led to the publication of a sequel, *Tom Brown at Oxford.* The former is one of the best boys' books that appeared in the nineteenth century. See RUGBY; ARNOLD.

Hugo, Victor (1802-1885), a noted French novelist and poet. He was born at Besançon and was educated at Paris and later at Madrid, his father being a soldier in the service of Joseph Bonaparte. He began writing at the age of twelve, and gave a novel to the press at the age of twenty-one. It was his ambition to write on modern themes in a French manner. He led a crusade against writers who followed ancient, especially Greek, models. He wrote several dramas. *Hernani* in 1830 made him at once famous. His popular fame rests on his novels. *Notre Dame* appeared in 1830; *Les Miserables* in 1862; *L'Homme qui Rit,* or *The Man Who Laughs,* in 1869; *The History of a Crime,* in 1877. These are his most celebrated productions. His complete works fill forty volumes. *Les Misćrables* is one of the world's great novels. His poetry is of high rank. One critic goes even so far as to say, "He found French poetry a palace of brick and stucco, and left it a palace built of jewels, a palace of the Arabian Nights."

Hugo is one of the great teachers of democracy. He was a determined opponent of Napoleon III, and deemed it wise to

go into exile. Much of his writing was done in a country home in the island of Guernsey. He took a deep interest in current events, and was much mortified by the outcome of the Franco-Prussian War of 1870. In 1876 he was made a senator.

It is only fair that an author should be allowed to speak for himself. The following passage is held to express Victor Hugo's philosophy of life:

Since it is given to no one whatsoever to escape the dream, let us accept it. Only let us try to have the right one. Men hate, are brutes, fight, lie; leave their dream unto the shadows. But share you your bread with little children, see that no one goes about you with naked feet, look kindly upon mothers nursing their children on the doorsteps of humble cottages, walk through the world without malevolence, do not knowingly crush the humblest flower, respect the needs of birds, bow to the purple from afar and to the poor at close range. Rise to labor, go to rest with prayer, go to sleep in the unknown, having for your pillow the infinite; love, believe, hope, live; be like him who has a watering pot in his hand, only let your watering pot be filled with good deeds and good words; never be discouraged, be magi and be father, and if you have lands cultivate them, and if you have sons rear them, and if enemies bless them—and with that sweet and unobtrusive authority that comes to the soul in patient expectation of the eternal dawn.

He cannot be simple; the only light he has to give blinds you like that of a fire. He astonishes a reader and provokes him; he moves him and sways him. The great poet cannot shake off the charlatan; and France is the world; Paris is France; Hugo is Paris; peoples bow down.—Amiel.

Huguenots, hū′ge-nots, the Protestants of France during the religious struggles of the sixteenth and seventeenth centuries. The origin of the Huguenots dates with that of the Lutherans in Germany and the Presbyterians in Scotland. Their theological views were largely those of Calvin. During the reign of Francis I and his successor, Henry II, Protestant views spread so rapidly that the Huguenots became a political power in the kingdom. Their head was the Bourbon family, represented by the king of Navarre and the prince of Condé. The ducal family of Guise headed the Catholic party. The history of France during the latter half of the sixteenth century is little more than the record of a series of bloody civil wars between the two parties. Burnings and pillage were common. Without doubt, the people were actuated by zeal for their religious views, but the leaders on both sides appear to have been wordly-minded men, shockingly lacking in principle. They struggled like wolves for the control of young, weak kings. The queen mother, Catharine de Medici, one of the most unprincipled women of the day, set off the factions one against the other, as she thought might be best for the interests of her family. At one time, when the Protestants had been lulled into a false sense of security, she set on foot the Massacre of St. Bartholomew, the most horrible affair of the kind known in history.

The war between the factions came to an end toward the close of the century. Henry III, the king, caused Henry, the leader of the Guises, to be assassinated. Henry of Navarre then ascended the throne in 1589 as Henry IV. At the advice of counselors he espoused the Catholic religion. As king he was able in 1598 to issue the Edict of Nantes, guaranteeing the Huguenots freedom of worship in all towns and villages where they already had congregations. Paris and cathedral cities were excepted. The Huguenots were to enjoy the same political rights as the Catholics, and were eligible to all public offices. As a means of security, Henry permitted his old followers to retain fortifications. He made Sully, a leading Calvinist, his prime minister. For a time Huguenots and Catholics had rest. In 1624 Richelieu, the great French prime minister, decided that the interests of the kingdom demanded that the fortifications of the Huguenots should be placed in the king's hands. A local war followed. The Huguenots made an obstinate defense. Rochelle, their stronghold, fell before the royal troops in 1629. For a time after this the Huguenots were permitted freedom of worship, but, naturally enough, they were not particularly loyal subjects. In 1685, during the reign of Louis XIV, the Edict of Nantes was revoked. The Huguenots were ordered to join the Catholic church. Bodies of dragoons were sent into the provinces to compel obedience, just as under the Stuarts the dragoons were sent into Scotland to compel the Covenanters to join the Episcopal church. It is estimated that 300,000 Huguenots fled to Switzerland, Holland, England, and America.

Even before the revocation, the Huguenots, foreseeing what was coming, began to emigrate. Colonies were located in Brazil, Florida, Acadia, Canada, and the West Indies. New Amsterdam, now New York, was founded by the Huguenots under Dutch auspices. Peter Minuit was a Huguenot. Many migrated to Boston, Hartford, and the points farther south. In 1680 the city of Charleston was founded by French Huguenots. Colonies were planted on the Savannah. General Oglethorpe was a Huguenot. The history of the Huguenots in America includes a surprisingly large number of families of influence and reputation. Unlike the French of Louisiana and Canada, the French Huguenots have intermarried with other denominations to such an extent that they ceased long ago to form a distinct element.

See ST. BARTHOLOMEW, MASSACRE OF; COLIGNI.

Hull, or **Kingston-Upon-Hull,** the third river port of England, is situated in the East Riding of York and on the west bank of the river Hull, where it discharges into the estuary of the Humber. Hull was an important city long before it received its charter from Edward II in 1298, and is still an important industrial center. British warships are built in the shipyards of Hull; and other manufactures are vegetable oil, oil cake, leather, foundry products, linen, cotton, chemicals, machinery, rope, sailcloth and brewery products. Its docks are among the largest in the world. The markets, street railways, lighting and water plants, baths, sewage disposal plant and similar conveniences are the property of the city. One of the most important structures in Hull is Trinity Church, built in 1412. Other features are a grammar school established in 1486, the market hall and the corn exchange. In 1921 the population was 287,013.

Hull, Quebec, an industrial city and the county town of Ottawa County, is on the Ottawa River where it meets the Gatineau, and is opposite Ottawa, Ontario. The two cities are connected by suspension bridges. Power generated by the Chaudiere Falls of the Ottawa drives the wheels of the various manufactories of Hull, some important products of which are Portland cement, watches, sulphur, pulp, paper, sulphite, pails, lumber and packing house products. In 1900 this flourishing city was almost completely destroyed by fire, but has since been entirely rebuilt and is growing rapidly. It contains the Roman Catholic College, modern primary schools and a spacious park. At the last census the population was 24,117.

Hull, William (1753-1855), an American soldier who, because of his unmartial haste in surrendering Detroit to the British during the War of 1812, was court-martialed and sentenced to be shot. Born at Derby, Conn., he was graduated from Yale College in 1772, studied law at Litchfield, Conn., and was admitted to the bar in 1775. Entering the army as a captain at the opening of the Revolutionary War, Hull served with honor at the battles of Trenton, Princeton, Saratoga, Monmouth and Stony Point. He rose to the rank of lieutenant colonel. After the war he was elected to the Massachusetts Senate, and in 1805 was appointed by President Jefferson to the governorship of Michigan Territory. Early in 1812 Hull was raised to the rank of brigadier general, and given command of the Northwestern Army. Soon after the opening of the War of 1812 he invaded Canada, but wasted time in issuing meaningless proclamations. Crossing back to the United States, he surrendered Detroit to General Brock on August 16, 1812, without making any real resistance. The death sentence passed upon Hull was commuted by President Madison, and it is now generally conceded that the blame for the conduct of the Northwestern Campaign should have been shared by the administration.

Hull House, one of the first American social settlements, was established in September, 1889. The original two residents believed that the mere foothold of a house, hospitable and tolerant in spirit, situated in the midst of the large foreign colonies which so easily isolate themselves in American cities, would be a service to Chicago. Its object, as stated in its charter is:

"To provide a center for a higher civic

and social life; to institute and maintain educational and philanthropic enterprises; and to investigate and improve the condition in the industrial districts of Chicago."

The various buildings which occupy the greater part of a city block are a main building for resident workers, cooperative building for working girls, gymnasium with baths, theater, cafeteria, music hall, apartments for residents, and a building devoted exclusively to the men's and boys' activities.

The activities of Hull House, many and varied, are planned to meet the changing demands of the neighborhood. In the afternoons after school hours, there are children's sewing, cooking, art and clay-modelling classes, play clubs, a lending library; in the evening for the adults, classes in English, mathematics, citizenship, literature, typewriting; also a lecture course devoted to current topics. In addition there are social clubs for the young people. For both young and old there are dancing classes, dramatics and musical training. For the boys and men there is athletic training, manual training, a boys' band, a library, billiard rooms and bowling alley. As a social center, Hull House is a meeting place for the neighborhood groups representing more than ten nationalities. Hull House also maintains the Bowen Country Club in Waukegan, where over a thousand mothers and children are given a two weeks' outing during the summer. One of the most important functions of the House is the reception of the many people at the front door. Hull House has become a clearing-house of information for the stranger within our gates seeking adjustment, as well as for the individual in need of immediate material relief.

Humboldt, hŭm'bōlt, **Friedrich Heinrich Alexander (Baron Von)** (1769-1859), a German traveler and naturalist. He was a native of Berlin. His father was a man of rank. Alexander was educated at the universities of Frankfurt, Berlin, and Göttingen. He studied mining and botany at Freiberg and became an overseer of mines. From boyhood he had a strong desire to travel. In 1797 he resigned his position. He resided for a time at Jena, where he fell in with Goethe and Schiller. His brother Carl Wilhelm had taken to public life and had been appointed Prussian minister to Paris. Alexander accompanied him and made a study of the famous botanical gardens in that city. He then went to Madrid and obtained the king's permission to travel in the Spanish countries of South America. He spent five years in exploring that grand division. He traced the head waters of the Orinoco into those of the Amazon, visited Cuba, crossed the Andes five times, and climbed Chimborazo. He visited Mexico and the United States. In 1804 he landed at Bordeaux, France, with an immense amount of fresh knowledge of geography, geology, climate, botany, zoölogy—in short, every branch of natural science—as well as an acquaintance with native peoples and political conditions in various countries. In 1845-48 he wrote a large work called *Cosmos,* on which his reputation chiefly rests. It discusses physical laws and effects, and may be regarded as the basis of the modern subject of physical geography. No scientific man of that day had traveled so widely as he. Very many of the geographical principles, now understood by every school boy, were then understood imperfectly or not at all. Humboldt had a great mind for deducing principles. His opportunity was great. He made the most of it. He is one of the great names in the history of geography and of physical science. He died in the city of his birth in 1859. See GEOGRAPHY.

Hume, hūm, **David** (1711-1776), a Scotch man of letters. He was born and educated at Edinburgh. His studies at the University were designed to fit him for the law, but he took to literature. He studied three years in France. He made a living as a teacher and as a private secretary until appointed librarian at the University of Edinburgh. He wrote a number of works on philosophy, morals, and religion that have brought him little fame, but his *History of England* is a masterpiece. It is written in a clear, attractive style, hardly second to that of Macaulay. Hume was the first English historian to make place for chapters on literature and the condition of the common people.

Humidity, the state of the atmosphere, as regards the amount of watery vapor it contains. The absolute humidity is the actual weight of water in a given volume of air. It is the relative humidity, however, which is often expressed, or the amount of moisture the air contains compared to what it could contain at that temperature if saturated. The temperature must be considered, for the warmer it is the more moisture is needed to produce saturation. If the air contains three-fourths the amount of water required to saturate it, the humidity is said to be seventy-five; if one-half, it is but fifty. At the dew point the humidity is one hundred. The proper amount of vapor in the air is a very important consideration. In our modern homes and school buildings with heating plants, the humidity is often too low for good health. On the other hand, a moist, hot heat is detrimental to health in that it largely prevents perspiration. See HYGROMETER.

Hummingbird, a family of New World birds. About 400 species are found in the two Americas, ranging from Alaska to Patagonia. There are eight species on the Mexican border. The name comes from the insect-like rapidity with which they move their humming wings. The motion of the wings is so rapid, in fact, that the bird is able to hover stationary, without perching, while it probes with its long bill for nectar or gathers insects. Only one species, the ruby-throated, is found east of the Mississippi. It is a beautiful little fellow, the length of one's forefinger, with bright, shining, green upperparts, a ruby red throat, and purplish wings and tail. Two white eggs, half an inch in length, are placed in a tiny nest of plant down saddled on a limb fifteen to twenty-five feet from the ground. The outside of the nest is covered with lichens to make it look like a knot. The hummingbird feeds chiefly on insects caught on the wing or picked from flowers. The hummingbird's tongue is double nearly from end to end; so that the little bird is able to grasp its insect prey with its tongue, much as if its mouth were furnished with a pair of fingers. It is fond of plant sweets. The female bird feeds her young, at first not much larger than bluebottle flies, by thrusting her bill down their throats and ejecting a quantity of prepared food, chiefly minute insects, from her own storehouse. Bradford Torrey has written entertainingly on the hummingbird.

Humor, in literature, that quality of a composition which tends to excite mirth. Mirth is aroused primarily by that which surprises us, which is to a greater or less extent incongruous and therefore unexpected. There would be no humor in Dickens' description of the forlorn breakfast of the pupils at Dotheboys Hall if he had likened Mrs. Squeers' porridge to sawdust and water. But when he says that it "looked like diluted pin-cushions without the covers" the figure surprises us and makes us smile. Aldrich's story of Marjory Daw is a simple and entertaining love story until the climax—which not one reader in a hundred anticipates—is reached, then we are constrained to laugh not only at the hero's surprise, but at our own.

To a child, a man with a wooden leg, a boy with a hump upon his back, the foolish, the drunken, the insane, are laughable sights. The incongruity of these figures with his preconceived notions of the human form and of human conduct excite his mirth. When he has learned that misery accompanies such conditions they cease to be funny. So primitive people might find amusement in occurrences which would be repulsive sights to the more refined sensibilities of a civilized age. In the modern editions of many early English books portions which once caused laughter are omitted now as coarse, vulgar, and even brutal.

Humor in its higher and more delicate forms is closely akin to pathos. The writer who can successfully give a humorous touch to something which has stirred our sympathies or a pathetic turn in the midst of a laugh is the one who pleases us best. In Myra Kelly's *A Christmas Present for a Lady,* she draws a comical picture of a little boy who, lacking means for another Christmas gift, brings his teacher the receipt for a month's rent of a humble tenement. Then with a swift and delicate touch she makes us see that the bit of soiled paper meant *home* to father, mother, and child. The reader must needs laugh and cry together. Annie Trumbull Slosson combines

humor and pathos in her story of *Rebecca Mary,* the patient, obedient little girl who refused to take the "hundred and oneth" stitch. In an altogether different way, but none the less truly, are humor and pathos mingled in Mary Wilkins' *A Conflict Ended.* The picture of a man sitting on the church steps during service every Sunday for ten years because he wasn't "made strong enough to give in" is ridiculous, and grows laughable when his little old bride, in all the brave array of her "coming out" Sunday, is about to sit down beside him; but something else stirs us when the man gets the better of his prejudices and marches down the aisle with "almost the mien of a conqueror." In Kate Douglas Wiggin's *Timothy's Quest* we have a pathetic story told largely in humorous language; in *The Necklace* by Maupassant, an incident simply told, but in itself combining elements of both humor and pathos. Examples of this kinship between the humorous and the pathetic might be multiplied indefinitely.

Humor may be found in all forms of literature. To realize that the inclination to laugh is universal, one need but consider the columns of our daily papers and the pages of Sunday issues given over entirely to this sort of writing. Nearly all magazines have their humorous departments, and many books are written whose sole purpose is to arouse laughter, although humor is more pleasing when it appears as a seasoning to something else. A comedy, though entirely of a light character, arouses laughter by the display of contrasts—the holding up of the peculiarities of men and manners against a background which sets them off. This gives more pleasure to a cultivated taste than does a farce which is made up wholly of monstrosities and extravagances.

Those varieties of composition in which some form of humor seems especially acceptable are the novel and the drama. As an individual who has a sense of humor is more popular than one without it, so these forms of literature whose province is to picture human life are generally more pleasing if the humorous element is present. Shakespeare would cease to be Shakespeare were his humor eliminated. Dickens' exposition of the sufferings of children in schools, poorhouses, debtors' prisons, and living amid sin and poverty would be too heartrending to read, but for the saving grace of the smiles he is able to call forth.

Humor may be introduced in many ways. A writer may have an idea or incident to relate which is in itself laughable. When Octave Thanet tells us of a woman who went to church fully determined to commit suicide on her return, and had her attention diverted and her intention changed by seeing the entire congregation stick to the newly varnished pews, she has a really funny incident, and could hardly tell it so that it would fail of being humorous. But when Holmes writes that "Life is a fatal complaint and an eminently contagious one," he has found simply a new and humorous way of saying something that is not funny and is known to everybody. Other writers adopt a facetious style, savoring perhaps of bombast or sarcasm, or simply a style a little more dignified and involved than the subject warrants. If not overdone, this is truly humorous.

A critical distinction is made often between wit and humor, although the general word, humor, includes all forms that excite mirth. Wit appeals to the intellect; humor to the feelings, the emotions, the sympathies. Wit lies in the words—either in the expression of some point of similarity between ideas hitherto unrelated or in the discovery that some word bears a double significance to the subject in hand. Josh Billings' statement, "It is better to know less than to know so much that ain't so," is wit. Saxe's poems are examples of wit rather than of humor. Humor depends on the mood the author is able to put the reader into—on leading the reader to behold the situation through his eyes. Wit may appear suddenly in some one sentence of a discourse otherwise serious. Humor pervades a composition and affects its every part as salt savors food, or, to use a higher figure, as a striking personality characterizes every act of an individual possessing it. Goldsmith's *Vicar of Wakefield,* Lamb's *Essays of Elia,* Addison's *Spectator,* and Frank Stockton's stories are examples of humor as distinguished from wit. *The Autocrat of the Breakfast Table,* and notably Shakespeare's works, give us examples where both wit and humor appear.

Frequently what is in the first instance a blunder may become a conscious form of wit. For instance, what is known as an Irish bull is but a ludicrous inconsistency. It is said, by the way, that the word Irish is applied to the bull, not because the Irish make more, but because they make better bulls. "I couldn't have been in two places at once, barrin' I was a bird." "'Tis a strange world, few of us get out of it alive," "Here's to our native land, everybody loves it whether he was born there or not," are instances of this form of wit.

As wit depends largely upon the significance of words, it is possible to learn to observe double meanings and unusual applications so as to acquire a habit of witty expression. Humor, however, is thoroughly one's own. A man is born with humor or he never has it. Each has his own particular variety, as little likely to be mistaken for another's as is the expression of his face.

Returning to the more general signification of the word humor we may note that satire in its milder forms is a variety of humor. When satire becomes so bitter as to cease to be pleasing it is invective. *The Voyage to Lilliput* in Swift's *Gulliver's Travels* is decidedly humorous, but, in the later parts of the same work, the quality of humor gives way to bitterness. The satire of Thackeray and sometimes that of Byron is humorous. The Spanish writer Cervantes is looked upon as a master of satire. His *Don Quixote,* a burlesque on the popular tales of chivalry, is probably the greatest distinctively humorous work ever written. Among English writers who are known first and best for their humor, the names of Hood and Lamb are foremost. Hood's wit earned him his living, although his serious productions are those which have brought him fame.

In America, from *Poor Richard's Almanac* and Irving's *Knickerbocker's History of New York* to the present day, our literature has been characterized by humor. We have writers who, like Mark Twain, Artemus Ward, or Josh Billings, always write as "funny as they can." Others, like Bret Harte, Aldrich, and Howells, are writers of both serious and humorous productions. If Holmes and Lowell are read more often than Longfellow or Whittier or Emerson, it is because they make us smile more. It has been said that women writers are without humor, and the greatest of England's women authors, Mrs. Browning and George Eliot, would seem to bear out this statement. Many American women writers, especially those of the present day, display both wit and humor in a marked degree. Among them may be mentioned Kate Douglas Wiggin, Mrs. Deland, Marietta Holley, Octave Thanet, and Carolyn Wells.—MARY BLANCHARD MURPHY.

Wit vibrates and spirts; humor springs up exuberantly as from a fountain and runs on. In Congreve you wonder what he will say next; in Addison you repose on what is said, listening with assured expectation of something congenial and pertinent.—Landor.

I am not speaking of the fun of the book (Don Quixote), of which there is plenty, and sometimes boisterous enough, but of that deeper and more delicate quality, suggestive of remote analogies and essential incongruities, which alone deserves the name of humor.—Lowell.

When Wit and Humor are commingled, the result is a genial sharpness, dealing with its objects somewhat as old Izaak Walton dealt with the frog he used for bait—running the hook neatly through his mouth and out at his gills, and in so doing "using him as though he loved him."—Whipple.

Humperdinck, Engelbert (1854-), a German composer whose fame dates from the phenomenal success of his fairy opera, *Hansel and Gretel,* first produced at Weimar in 1893. He was born at Siegburg, near Bonn, and for a time studied architecture. Herr Humperdinck then took up music, but his first productions were almost complete failures. Becoming closely associated with Wagner, he assisted the master in the production of *Parsifal.* In 1905 Herr Humperdinck visited America and assisted in the production of his *Royal Children* at the Metropolitan Opera House. He composed several other operas, none of which equal the two already mentioned. He also composed incidental music to several of Shakespeare's plays.

Hundred, in central and southern England, a name for a district corresponding to the wapentake of northern England. The country is divided into one-hundreds, corresponding, no doubt, to the districts which in early time were able to furnish

100 men able to bear arms. The term was introduced into several of the American colonies, and is still retained in Delaware, where a hundred corresponds to the town, township, or parish of other states. See CHILTERN HUNDREDS.

Hundred Days, a term applied to the period from Napoleon's return from the isle of Elba in March, 1815, to his abdication after Waterloo, June 22, 1815. The Bourbon monarchy under the restored Louis XVIII was becoming unpopular; the soldiers accustomed to promotion for merit, were dissatisfied at seeing refugee nobles put over them; Napoleon himself chafed at the narrow limits of his island. Accordingly, escaping from Elba, he crossed to the mainland and advanced toward Paris. Soldiers drawn up to oppose him deserted and went over to his standard. His march was a triumphal procession. Louis XVIII fled across the border, and Napoleon resumed the reins of empire, promising liberal government to France and a peaceable attitude toward foreign powers. The Allies refused to negotiate with him and immediately raised armies to go against him. Then came the campaign ending in the battle of Waterloo, and his decisive defeat, June 18, 1815. The empire was overthrown and on June 22, Napoleon abdicated. See WATERLOO.

Hundred Years' War, a series of wars between England and France, extending through rather more than a hundred years (1338-1453). The wars began in the reign of Edward III. Ever since William the Conqueror, who was a French vassal, had seized the throne, the English monarchs had been vassals of France, owing the French monarch allegiance for Normandy and other large fiefs. The French monarchs had no desire for vassals so powerful, and lost no opportunity to transfer these holdings to French noblemen. John, the unworthy king, and Henry III lost heavily on the Loire; and, while the Edwards, father and son, were trying unsuccessfully to make Scotland a fief of the English crown, the French monarch took advantage of them and they lost Aquitaine, the last fief held under the French crown. Edward III of England set up a claim not to the lost fiefs, but to the French crown, and added "King of France" to his title. A series of invasions of France followed. Hostilities were carried on in French territory. The English won at Crecy, Poitiers, and Agincourt. The fairest provinces of France were held by English garrisons. Enormous booty was carried home to England. In 1415 Henry V so far subdued the French that his infant son, nine months' old, was proclaimed "King of France" in Paris. As the civil wars of England, known as the Wars of the Roses, drew on, the French succeeded in driving the English from all their holdings but Calais. The English claim to the throne of France was relinquished formally in 1802. See CRECY; CALAIS; BLACK PRINCE.

Hungary. A state of eastern Europe, formerly a part of the Austria-Hungarian monarchy. Hungary under this union had an area of 125,000 square miles and a population of some 20,886,000. Under the rearrangement of European boundaries following the World War this area, however, was greatly reduced. The province of Croatia and Slavonia was given to Jugoslavia, Slovakia was assigned to Czechoslovakia and Rumania, and Transylvania was given to Rumania. The valuable province of Burgenland was assigned to Austria. Some of the boundaries are not definitely settled at this time, and owing to the dispute over them they were left to a commission which was to report to the League of Nations.

Under this division and in accordance with the Treaty of Trianon, Hungary was deprived of about two-thirds of its territory. Its present area is approximately 36,000 square miles, making it about the size of Indiana, and the population in 1921 was 7,840,832. The population of the old Kingdom consisted of Magyars, Germans, Slovaks, Rumanians, Ruthenians, Croats and Serbians. In dividing the territory the principle of nationality was followed, so that the population of Hungary at the present time consists almost entirely of Magyars. The country is bounded on the north by Czechoslovakia, on the east by Rumania, south by Jugoslavia, and the west by Austria.

ECONOMIC CONDITIONS. Originally, Hungary was a country of mountains, hills

and valleys, but it now consists almost entirely of the fertile plains of the Danube and the Thiess and their tributaries. This region is especially adapted to agriculture, and about 70 per cent of the people are engaged in this occupation. Wheat, rye, oats, and stock raising constitute the chief agricultural industries.

The loss of the outlying provinces deprived Hungary of most of its mineral wealth. Coal mining is at present the most important mineral industry. There are some iron mines of value within the country, but they are not at present worked. The silver, cobalt, nickel, zinc and lead were lost when Transylvania was given to Rumania. Of the vast areas of forests of the original country only about 17 per cent remain. It is estimated that in the division of Hungary she lost over 50 per cent of her agricultural productions, and 60 per cent of her industrial capacity. She is now reduced to an interior country, having lost her sea coast to Jugoslavia. The Danube has been internationalized and is now the principal outlet for foreign commerce.

Numerous railway lines extend through Hungary from east to west and from north to south. These are being electrified as rapidly as possible, the intention being to complete electrification for the purpose of saving coal. The leading engineers of the country consider that with the electrification of the railways there will be sufficient coal to supply the needs of the nation.

Education. The elementary public schools include infant schools, elementary schools, higher-primary schools, secondary schools for girls, academies and professional and technical schools for preparing those who wish to enter the various professions. Attendance is compulsory between the ages of six and twelve.

Government. The union of Austria and Hungary was never satisfactory to the Hungarians, and immediately after the armistice closing the Great War, a republic was proclaimed under the title of the Hungarian Peoples' Republic. Count Michael Karolyi became provisional president, but his government was overthrown on March 22, 1919, and was succeeded by a Soviet government under Bela Kun. The purpose of this government was to spread Bolshevism through Hungary and adjoining countries. The Soviet government was overthrown by the aid of the Rumanian army on August 7, 1919, and a new government organized. Elections were held in January and February, 1920, and the new parliament chose a regent with the title of Protector of the Magyar Republic. Admiral Nicholas von Horthy was selected regent on March 1, 1920, and was at the head of the government at the close of 1922. The election in May, 1922, resulted in a large majority in favor of maintaining the Horthy government. There are practically two leading political parties, the Legitimists, who consider Charles's son Otto as the uncrowned king, and the Free Choicers, who desire to choose the king by election. Count Stefan Bethlen continued as Prime Minister.

Soon after the formation of the Republic the government resolved that no member of the House of Hapsburg should again occupy the throne of Hungary. This resolution was in accordance with similar resolutions passed by the governments of Czechoslovakia and Jugoslavia. Regardless of these resolutions, Charles I, the former emperor of Austria-Hungary, in 1921 made two attempts to regain the throne. On the first attempt he was compelled to return to Switzerland. The Allies protested against this movement by Charles and the Little Entente was especially emphatic in its protest. On his second attempt Charles rallied around him a force of about 12,000 men and attempted to invade the country. His army was defeated and Charles and the Empress Zita were captured. The royal family was finally exiled to the Madeira Islands, where Charles died April 1, 1922. Following his death an unsuccessful attempt was made to place his son Otto on the throne. The Empress Zita accepted an invitation to reside in Spain, where she continues to regard herself as Queen of Hungary, and insists that her son Otto is heir to the throne. Her claims, however, are not given serious consideration.

The Hungarians, or Magyars, are a

high-spirited, war-like and generous people. They are proud and fond of elegant dress and of entertainment. While some consider them to be related to the Turk, they are far superior to him. Whatever their racial affinities may be, Europe owes much to the Hungarians for barring the entrance of the Turk through the Iron Gate. Under their celebrated General Hunyady, they held back the Turks single handed and saved Europe from being overrun by Turkish civilization. On September 18, 1922, Hungary was admitted to the League of Nations.

Hungarian Fascisti organized on the plan of the Italian Fascisti number several thousand. They plan a strong nationalist movement to direct the interest of Hungary, regardless of the wishes of the National Assembly.

In October, the Hungarian Home Office decreed that all foreigners living in the country should report to the police and state their occupations. Those whose occupations were objectionable were to be deported. The Minister of the Interior declared that this was not an anti-Semitic measure, but since most of the immigrants came from Galicia, the majority of foreigners to be expelled naturaly would be Galician Jews.

A Free Trade Congress under the auspices of the Cobden Club met at Budapest October 17. A resolution in favor of free trade "as the sole means of reconstruction in Europe" was passed.

STATISTICS. The following are the latest reliable statistics to be had:

Area, square miles	35,654
Forest area, acres	1,357,438
Population (1921)	7,840,832
Chief Cities:	
Budapest	1,181,616
Szeged	109,896
Debreczen	103,228
Kecskemet	72,768
National revenue	$ 2,104,111,150
Bonded indebtedness	$10,890,608,000
Farm area, acres	6,550,000
Wheat, bushels	47,087,000
Corn, bushels	27,141,000
Rye, bushels	22,095,000
Oats, bushels	20,140,000
Barley, bushels	20,592,000
Potatoes, bushels	45,592,000
Raw silk, pounds	110,000
Sugar beets, short tons	36,376
Domestic Animals	
Horses	746,423
Cattle	2,221,988
Sheep	1,817,405
Swine	3,729,1[illegible]
Imports from United States	$1,521,[illegible]
Exports to United States	$262,[illegible]
Coal mined, tons	4,458,[illegible]
Sugar, pounds	637,875,[illegible]
Miles of railway	[illegible]72
Teachers in public schools	29,611
Pupils enrolled	2,754,000

Huns, a wild, nomadic people of northern Asia. They are regarded as a branch of the Mongolians, who invaded the Chinese Empire about 200 B. C. The Great Wall of China was built to keep them out. They appeared in authentic history about 375 A. D. Under Attila, their leader, called the Scourge of God, they established an immense empire in western Asia. They drove the Goths west of the Danube and penetrated Europe as far as Chalons, France. Here a terrific battle was fought, lasting several days; here they are said to have lost the improbable number of 300,000 warriors. They were defeated and retired eastward. After the death of their great leader they disappeared gradually from European history. They are described by Roman writers as a short-legged, stout race, with strongly knit limbs, thick necks, and black eyes. The men were without beards, the women without beauty. They had no desire to be under a roof, but spent their time in the saddle. Even their military conferences were held on horseback. They never tilled the soil. They are not to be confounded with the Hungarians, who came into Europe several centuries later. See ATTILA.

Hunt, James Henry Leigh (1784-1859), an English poet and essayist, commonly known by the name of Leigh Hunt, over which he wrote. He was born at Southgate, near London. In his young manhood he engaged in newspaper work. In 1812 he was arrested for writing an article reflecting on the character of the prince regent. He called the prince "a corpulent Adonis of fifty." He was imprisoned for two years and fined $2,500. His confinement was more of an ovation than anything else. Flowers, books, games, and friends made time pass rapidly. Soon after his release he published the *Story of Rimini*,

HUNS PILLAGING A VILLA

an Italian tale in verse. In 1818, he started a weekly paper, *The Indicator,* in imitation of *The Spectator.* He was a "bright and shining light," Stedman tells us, in what was derisively called the Cockney School of poets, which included Shelley, Keats, Hazlitt, and others. In 1822 he went to Italy to assist Byron and Shelley in their projected paper. Shelley died that same year and, as there was little sympathy between Byron and Hunt, the plan was abandoned. In 1828 he published a volume of *Recollections of Lord Byron.* Though not a writer of the first rank, a knowledge of Leigh Hunt and his works is requisite to a grasp of the literary history of the first half of the nineteenth century. His *Men, Women, and Books, The Town, Its Memorable Characters and Events, Autobiography,* and *Table Talk* are interesting reading. It is believed that Leigh Hunt was the original of the irresponsible Harold Skimpole in Dickens' *Bleak House.* Dickens denied this, and, if it be true, the character is, of course, exaggerated.

Hunt, William Holman (1827-1910), an English painter. He studied at the Royal Academy in London, his birthplace. When he was about twenty-one, Rossetti, Millais and he banded together to form the preraphaelite school of painting, being ably seconded by Ruskin. Their fundamental principle was that all painting should have a marked moral effect and that a picture which was merely beautiful had no reason for being. They painted nature with a breadth and freedom that has been much admired. In 1854 Mr. Hunt went to Palestine to study Biblical scenery at first hand. His best-known paintings are *The Light of the World* and *The Awakening Conscience;* after his trip to the Holy Land, he painted *The Finding of the Saviour in the Temple, The Scapegoat, A Street Scene in Cairo, Portrait of Rossetti, The After-Glow in Egypt,* and many other pictures.

Hunt, William Morris (1824-1879), a noted American portrait, figure and landscape painter whose efforts for the advancement of American art were incalculably valuable. He was born at Brattleboro, Vt., and studied at Harvard for a time, but was forced by ill health to leave. He traveled and studied sculpture and painting in Europe. Returning to the United States, Mr. Hunt settled in Boston. There he became a teacher of painting, imparting to his pupils a knowledge of the latest Parisian methods. Mr. Hunt's best works are his landscapes, though in all his work is noted a perfected technique and a fine sense of color values. He committed suicide while under a sudden derangement. Among his finest works are *Head of a Jewess, Sheep Shearing at Barbizon, Girl With the Kitten, Gloucester Harbor, The Hurdy-Gurdy Boy* and *Dead in the Snow.*

Hunter, John (1728-1793), a famous surgeon. He was a native of Lanarkshire, Scotland, an uncle of Joanna Baillie. He was educated at Oxford University. After filling various hospital and army appointments, he settled down in London to the practice of surgery. He was a lecturer in various hospitals. The famous Jenner was one of his students. Dr. Hunter was one of the most progressive surgeons London has ever seen. He was a thorough student. He converted his home into a museum. At his death he left 10,563 specimens and preparations illustrating human and comparative anatomy. His collection now forms the nucleus of the anatomical museum of the Royal College of Surgeons, London. An older brother, William Hunter, was noted likewise for his skill and habits of investigation. He left a very large collection to the University of Glasgow. See SURGERY.

Hunting, the sport of pursuing game. No occupation is of more ancient standing than hunting. With us a recreation, with the primitive man it was the very means of supporting life. Though the steady advance of civilization has relieved man more and more from the need of earning his living in this wise, the love of the chase has never left him. A normal, healthy man without a fondness for hunting is a curiosity rarely met with. The sport has been the favorite pastime of many great men. Never has Theodore Roosevelt waxed more enthusiastic than over the delights of hunting big game; several of his books deal solely with his hunting expeditions and their results. The excite-

ment of the chase has inspired some of the merriest music even of great composers. Everyone is familiar with some of these rollicking "jagdlieder." One can scarcely think of an English country-gentleman without conjuring up the early morning hunt,—the scarlet-clad party of fresh-faced men and women dashing off through the parks in quest of the prized "brush."

Among true sportsmen there are definite rules of the game which constitute a sort of unwritten code of honor. "Pot" shooting, or the cruel slaughter of wild creatures for market purposes, is as distasteful to them as to those outside the pale. No less so is the "sport" of those so-called hunters who shoot ducks by the hundred, simply to "make a record." In the early days of the first railroad to the Pacific, numbers of such "hunters" shot down hundreds of bison from the windows of the trains. Grover Cleveland in *Fishing and Shooting Sketches,* says:

"I believe that those who . . . belong to the sporting fraternity, and are actuated by a genuine sporting spirit, are neither cruel nor greedy and wasteful of the game and fish they pursue; and I am convinced that there are no better conservators of the sensible and provident protection of game and fish than those who are enthusiastic in their pursuit, but who, at the same time, are regulated and restrained by the sort of chivalric fairness and generosity felt and recognized by every true sportsman."

Huntington, Ind., a manufacturing city and the county seat of Huntington County, is on Little River, 24 miles southwest of Fort Wayne. It is served by three railroads. The principal manufactures are pianos, lime, furnaces, boots and shoes, cedar chests, gloves and railroad cranes. There are also railroad shops and woodworking shops. This city was among the first in the world to operate a system of automobile transit cars. It is the seat of the United Brethern College, and has a public library and fine public schools. The city owns and operates the water works and the electric light plant. The population was 14,000 in 1920.

Huntington, W. Va., an industrial city and the county seat of Cabell County, is situated on the Ohio River, 20 miles east of Ironton, Ohio. It is served by the Guyandotte Valley, the Baltimore & Ohio and the Chesepeake & Ohio railroads, and the latter road maintains extensive car manufacturing shops here. Other manufactures include glass and china, stoves, bricks, lumber, foundry products and furniture. It contains Marshall College (the State Normal School) St. Edward's College, a $300,000 high school and fine graded schools. The city is well paved and lighted, with many attractive buildings besides those mentioned. Population, 1920, 50,177.

Huntsville, Ala., an industrial city and the county seat of Madison County, is 96 miles north of Birmingham, on the Southern, and the Nashville, Chattanooga & St. Louis railroads. It is in the center of the Tennessee Valley, one of the richest agricultural districts in the state, and is a center of extensive commerce in cotton, fruit and live stock. Among manufactures are cottonseed oil, bricks, mattresses, brooms, fertilizer and sashes and doors. It also has large cotton mills. Huntsville has many schools of high grade both public and private, and the Alabama Agricultural and Mechanical College is situated near the city limits. In 1920, Huntsville had a population of 8,018. Immediately contiguous to the city are found East Huntsville and West Huntsville, which, if considered with the present census population, would make a population of some 18,000 or 20,000.

Hurdy-gurdy, a musical instrument of rustic England. It consists of four strings stretched on a box after the manner of a lute. Two are tuned a fifth apart for the production of a drone bass. The other two are tuned in unison. They can be shortened by pressing finger keys. The strings are sounded by a rosined wheel. The wheel is turned by a crank in the left hand, the right hand being free to play the finger keys. The hurdy-gurdy is carried usually by a band around the neck. It is a crude, harsh instrument, with little musical compass, and, indeed, with little music of any sort. It works more or less like a hand organ. It dates from the ninth century.

Huron, Lake, one of the Great Lakes. It lies between Michigan and Ontario. It

receives the waters of Lakes Superior and Michigan and discharges them through the Detroit River into Lake Erie. At an early day the water of this lake was discharged by an outlet farther to the eastward. Lake Huron, with Saginaw Bay on the west and Georgian Bay on the east, has a total area of about 22,322 square miles. Its surface is 581 feet above the level of the sea. It lies twenty-one feet below the level of Lake Superior. The greatest depth is about 750 feet.

Huron, S. D., the county seat of Beadle County, is on the Great Northern and the Chicago & Northwestern railroads, 120 miles east of Pierre. It is a division point for the Chicago & Northwestern Railroad, which has here machine shops and round-houses. Huron is in the center of a rich agricultural and stock raising district, and alfalfa, wheat, oats, hogs and cattle are important articles of commerce. There are flour mills, grain elevators, wagon works and brick yards. The state fair is held here, and the city is the seat of Huron College. The government is by commission. In 1920, the population was 8,302. A packing plant has just been completed at a cost of $1,000,000. Huron is the convention city of the state, over forty conventions having been held here during the past year.

Hurricane, a destructive wind of the West Indies and the Atlantic coast. To place the hurricane in its right relation to the winds, the reader should consult first the article on CYCLONE. A hurricane is a whirlwind, not a straight-away wind. It is more violent and covers a smaller area than a cyclone. It is larger and less violent than a tornado. The diameter of a tornado is so small that the whirling motion is apparent. The diameter of a hurricane is so great that it seems like a straight-away wind. If a hurricane were to contract to a mere column, it would become a tornado. If it expand in diameter and die out into an ordinary breeze, it becomes a cyclone.

Hurricanes are huge, violent whirlwinds that rise in the tropics and sweep across the West Indies and along the Atlantic coast toward the northeast. Once in a while one of these storms drives up along the western slope of the Alleghanies into the region of the Great Lakes, where it does damage to shipping. More frequently, however, the hurricane that takes this path expands in area and dies out into an ordinary cyclone. The path of the ordinary hurricane follows the Atlantic coast. The hurricane of 1909 was one of the most destructive of recent times. Notice was sent out that the wind was rising; the whirl was forming in the region of the Windward Islands. It passed across the western end of Cuba, unroofing buildings and uprooting trees. Twenty-five persons were injured; five lives were lost in Havana; fifty small ships and cargoes were sunk or blown ashore. Land and sea, $1,000,000 worth of Cuban property was destroyed.

This storm, foretold a week in advance, struck Key West, Florida, with a circular velocity, it is claimed, of 100 miles an hour. Of 100 vessels at anchor, ninety-five were torn from their moorings; business blocks were wrecked; factories were destroyed; railroads were carried away. Many lives were lost; the damage to property in the harbor and the town cannot have been less than $2,000,000. The high wind continued at Key West from eight A. M. to three P. M. By the time the storm reached Savannah the velocity of the wind did not exceed sixty miles an hour. Wireless messages were sent from stations along the coast to warn ships *en route* of the approach of the storm. A similar hurricane in 1906 cost the lives of 140 laborers engaged in railroad work on the Florida Keys. A storm of similar origin and direction is frequent in the East Indies, where it is known as a typhoon.

See WIND: CYCLONE.

Husband and Wife, the correct legal and popular terms to denote a man and woman married to each other. The modes of contracting marriage, with the accompanying ceremonies, and also the legal impediments to marriage vary considerably in different countries, and the laws in the United States respecting marriage and the relations of husband and wife are subject to the control of the various states, and differ materially in many of them.

Generally speaking, however, the law regards marriage as a contract, but it is

something more. An ordinary contract may be terminated by mutual consent; the marriage relation cannot be so terminated, though the parties may separate and live apart by mutual agreement. After the contracting parties have entered into the marriage state, an eminent legal authority has said that they have not so much entered into a contract as into a new relation, the rights, duties and obligations of which rest, not on their agreement, but on the general law of the state, statutory or common, which defines and prescribes these rights, duties and obligations. The relation itself was established by mutual consent, that is, by contract; but the relation, once established, can be neither modified nor changed at the mere will of the parties. The law must be invoked to change it, and legal action must await the decision of a competent court.

Marriage is one of the leading bases of law, although no two systems of law are exactly agreed as to the modes of constituting marriage, the rights which it confers, or the obligations which it imposes. It is probable that laws first began to grow around the institution of marriage; indeed in some countries the old names for "law" and "marriage" are interchangeable, and everywhere the institution of marriage equally with that of laws has been ascribed to the first rulers of men. Marriage even antedated all human law. It originated in the Garden of Eden. "And the Lord God said, It is not good that the man should be alone; I will make him an help meet for him. . . Therefore shall a man leave his father and his mother, and shall cleave unto his wife; and they shall be one flesh." And when the Pharisees came unto Jesus, tempting Him and saying unto Him, Is it lawful for a man to put away his wife for every cause? the answer was: "Have ye not read that He which made them at the beginning made them male and female, and said, For this cause shall a man leave his father and mother, and shall cleave to his wife; and they twain shall be one flesh? . . What therefore God hath joined together, let no man put asunder."

Divorce was permitted under ancient Jewish law, under certain circumstances, but the Church of Rome regards marriage as a lasting covenant, and the Protestant Episcopal church, in a somewhat lesser degree, also refuses to recognize divorce.

While experience and necessity everywhere led to the institution of marriage, the forms of the institution became exceedingly various at an early day. The broadest differences in different localities are indicated by the words monogamy and polygamy. Monogamy, the rule among the most advanced nations, is the general practice of mankind. Polygamy, where practised, is permissive only. Of old, the modes of getting a wife were the same as those of acquiring any other species of property, namely, capture, gift, sale, etc. The contract of sale was at the foundation of the marriage relation in every system of ancient law. When daughters belonged to fathers as their property, they were parted with only on the principles of fair exchange. Usually the contract was between the heads of families, the intending bride and bridegroom not being consulted. Now, among all civilized communities, marriage is in the eye of the law, a civil contract between the parties themselves, "evidenced in words prescribed by law, or by law counted sufficient," and it is usually attended by religious rites.

Domestic relations today, or the legal relations of husband and wife, are greatly changed from what they were even a hundred years ago, and in the United States there is now practical equality between man and wife Both have an equal right to vote, under the latest amendment to the national Constitution, which became effective August 26, 1920, and provides that "The right of citizens of the United States to vote shall not be abridged by the United States or by any state on account of sex." The property rights of married women have also been largely extended in most of the states, so that in this respect they are now generally on an equality with their husbands and can own, manage and bequeath their individual property as they choose, subject only to the husband's right of "curtesy," which is akin to the wife's right of dower.

Dower. Dower and curtesy rights of married persons are as old as any laws of real estate. Their primary purpose is to make provision against unjust or arbitrary treatment in respect to property owned by either party to the marital contract. Divested of dower right, a widow would have no right to any part of her husband's estate, if he should die without leaving a will. If he left adult children, they would inherit everything. If the children were minors, the widow would act as their natural guardian during their minority, administering the estate for their benefit exclusively. If there were no children, the blood relatives of the husband, or next of kin, could take all. In the one event, she would be dependent for her future support upon her children, and in the other upon her husband's relatives. In either event, it would be a matter of charity, not of right. But the widow's legal right of dower secures to her a one-third interest in her husband's estate during her lifetime. The "curtesy" right of a surviving husband operates to the same effect, but as the term implies it is looked upon more as an act of courtesy than as an actual right, though it is fully recognized by law. Either husband or wife may, under American laws, leave all or part of their property to the other by will; but the widow can always claim at least her one-third dower. It is common for a husband or wife to convey to the other by will such property as would accrue to the use of the legatee under dower or courtesy right; and in such case the benficiary under the will takes title to the property in fee simple, and may dispose of it as desired without regard to other heirs.

Dower differs from curtesy mainly in the fact that during the lifetime of the husband the wife has no actual ownership interest in the property. She is in no way responsible for its management or control. Husbands, on the contrary, immediately upon marriage may become charged with the management and control of their wives' estates. This is the common law, but in many states it has been abolished by inference, through the adoption of statutes giving married women the control and management of their own properties. And to establish the husband's right to curtesy, there must be issue born of the marriage. The curtesy title ceases with the death of the husband. As in the case of the dower right, it cannot be alienated or disposed of beyond the life of the beneficiary.

Blackstone declared that a husband had a right to give his wife moderate chastisement. No such right, happily, is recognized today. Chastisement is unlawful in any case and will render a husband guilty of assault and battery. Furthermore, if severe or often repeated, by the laws of many states this is a good ground of divorce for cruelty.

The general rule is that after marriage the husband's domicile becomes that of the wife; in other words, he has the power to establish the family domicile, and it is her duty to follow him. Furthermore, her refusal to follow, without sufficient excuse, is desertion in the eye of the law.

Huss, John (1369-1415), a Bohemian reformer and martyr. His name is derived from the little market village of Husinec in which he was born. His parents were well-to-do Czech peasants. He entered the University of Prague and took various degrees, becoming master of arts in 1396. Two years later he was an official of the university and a lecturer on theology and philosophy. In 1401 he was made dean, and, two years later, rector of the university. He appears to have acquired an influence over the Czech students and the Bohemian people. The University of Prague and all Bohemia was Roman Catholic. Huss began to advocate the views of Wyclif, the English reformer. Naturally, this course got him into trouble. The clergy of the city brought complaint against him.

About this time Huss became involved in a controversy between the Bohemian and the Germanic elements attending the university. The Germans seceded and established the University of Leipsic. The hatred which the Germans at this time acquired for the Bohemian leader is partly accountable for his later fate. The pope ordered his teachings inquired into. The archbishop burned Huss' works publicly

in the courtyard of his palace and excommunicated the reformer and his friends, forbidding the city of Prague to harbor him. Huss went home to his native village, but all Bohemia was in a ferment. In 1413 a general council of the church was called at Constance, Switzerland. Huss was ordered to attend and express his views. The emperor Sigismund gave him a safe conduct, promising him his protection, and giving assurance that he should be permitted to return home unharmed. In 1414 Huss was brought before the council. His doctrines were condemned and he was asked to withdraw his views and to make unqualified submission. This he declared he could not do. July 6, 1415, in the presence of the emperor, who had promised to protect him, he was degraded from the priesthood and turned over to the constables of the city, with orders that he be executed immediately. He was tied to a stake in the public square and faggots piled around him. Upon refusing for the last time to recant his errors, the faggots were fired and his body was consumed.

His followers, known as Hussites, rose in arms, and maintained a war of some twenty years, but were finally conquered and suppressed. The Hussite movement is one of the three great religious movements in western Europe, preceding Luther.

See CONSTANCE; BOHEMIA; JEROME; WYCLIF.

Hutchinson, Anne (1590-1643), a colonial religious reformer. She was a native of Lincolnshire, England. With her husband, she followed Rev. John Cotton to New England, arriving in Boston in 1634. At first a valued member of the church, she organized women's meetings, but was soon accused of teaching heretical doctrines, such as the right of individuals to decide questions of belief by virtue of individual light granted by the Holy Spirit. The Boston church was torn into factions. Bancroft, writing of the period, states: "The dispute infused its spirit into everything. It interfered with the levy of troops for the Pequot War; it influenced the respect shown to the magistrates, the distribution of town lots, the assessment of rates, and, at last, the continued existence of the two opposing parties was considered inconsistent with the public peace." Mrs. Hutchinson was brought before an ecclesiastical synod. Eighty-two opinions were condemned as erroneous. In November she was brought before the general court and sentenced to banishment, being allowed, however, to wait until spring before setting forth. She then went to the chief of the Narragansetts and, with the aid of Roger Williams, obtained from him an island subsequently known as Rhode Island. Here she formed a colony in which no one was to be harassed because "a delinquent for doctrine." Feeling later that Rhode Island was too near Massachusetts for entire safety, she migrated with her family to the territory of the Dutch, near New York City. Here Mrs. Hutchinson and her entire family, with the exception of a single child which was taken into captivity, perished in an Indian outbreak.

Hutchinson, Thomas (1711-1780), a colonial governor of Massachusetts. He was the son of a Boston merchant, and was graduated at Harvard in 1727. He held a number of offices both legislative and administrative. In 1769 he became lieutenant-governor of the colony of Massachusetts, but his loyalty to the British government made him unpopular with his American neighbors. His name is remembered now principally in connection with historical documents. Hutchinson wrote and published a *History of the Colony of Massachusetts Bay, from the First Settlement Thereof, in 1628, until the Year 1750; Brief Statement of the Claim of the Colonies,* and *A Collection of Original Papers Relative to the History of the Colony of Massachusetts Bay.*

Hutchinson, Kans., the county seat of Reno County, is situated on the Arkansas River, 40 miles west of Wichita. Four important railroads enter. This city contains some of the most productive salt mines in the United States. It is a meat packing and shipping center, and has grain elevators, and manufactories of flour, machinery, boilers, lumber and straw board. It is a popular city for conventions, and is the home of the State Fair. It contains the State Industrial Reformatory, and has

modern graded schools, a public library and a splendid high school. The population was 23,298 in 1920.

Huxley, Thomas Henry (1825-1895), a noted English scientist. He was a native of Middlesex, England. He studied at Charing Cross Hospital and took his degree in medicine at the University of London. In 1846 he was admitted to the medical service of the British navy. In the following year he received an appointment as assistant surgeon on the Rattlesnake, then about to be sent out on a scientific cruise in Australian waters. Huxley was absent from London four years. He had unrivaled opportunity to collect specimens of marine animals. He sent home a number of scientific papers to the Linnaean and to the Royal Society. When he returned he found himself a famous man. He was permitted to retain his position with the salary, but without the duties, for three years. During this time he made ready the greater part of his first important work, *The Oceanic Hydrozoa.* Without going into the details of Huxley's life it may be said that the most desirable scientific positions in London were at his command. He never lacked for a professorship or an opportunity to lecture. He was made a member of various scientific societies. In 1883 he was elected president of the Royal Society, the highest honor that could be paid to a scientific man. He was the winner, also, of various prizes for scientific attainments. In 1892 Queen Victoria made him a member of her privy council. He was an ardent supporter of Darwin, and did much to popularize the theory of evolution. Both as a writer and a speaker, he commanded the best of English. His papers are excellent examples of what is known in literature as the scientific essay. They are not only scientific productions, but they are literature. One of the most celebrated volumes is *Evidence as to Man's Place in Nature.* He was the author, also, of a number of college and school textbooks, including *An Elementary Physiology, Elementary Biology, The Crayfish,* etc.

Huyghens, hī′gĕnz, **Christian** (1629-1695), a Dutch mathematician and natural philosopher. He was born and died at The Hague, where the intervening time was also spent, except for a few years at school and in travel, and from 1665 to 1681 when he resided in Paris. His investigations of the mathematical theory of the compound pendulum, its application to clocks, and its use in determining the acceleration due to gravity, is alone sufficient to insure his fame. Furthermore his improvement of the telescope and discovery of the rings of Saturn, is a work in itself. Then to him, more than any other, is due the formulation of the wave theory of light, not generally adopted, however, till long after his time. His varied and practical labors have led to his being sometimes called the "Dutch Archimedes."

Hyacinth, hī′a-sĭnth, a bulbous plant of the lily family. There are over thirty species, chiefly natives of south Africa or the Mediterranean coast. The common hyacinth has half a dozen long, thick, green leaves and a central flower stalk bearing a cylindrical mass of fragrant, funnel-shaped flowers in many colors. The perfume is strongest during the middle hours of the night. Easily cultivated from bulbs. In Greek mythology there is a legend that the hyacinths sprang from drops of blood shed by the hero Ajax. See AJAX.

Hyde. See CLARENDON.

Hyde Park, one of the famous parks of London. It lies in the west central part of the city and may be reached by way of Oxford Street or Picadilly. It comprises 390 acres and adjoins Kensington Gardens. Before the English Reformation the site belonged to the abbots of Westminster. Henry VIII converted it into a park. In the reign of Elizabeth stags and deer were still hunted in it. Charles II held his horseraces here. A winding sheet of artificial water called the Serpentine occupies the center. It is fed from the Thames. Walks and drives are laid out with skill. The greater part of the park is covered with a dense green sward such as is seldom seen outside of the British Isles. There are no signs to keep off the grass. A flock of fine long-wooled sheep takes the place of lawn mowers.

A track a mile and a half long, following the southern border, is kept exclusively for

horseback riders. The old name, *Route du Roi,* French for the Route of the King, has been corrupted to Rotten Row. From twelve to two in the afternoon, and later, Rotten Row is a brilliant scene. The walks at the sides are thronged with spectators, while hundreds of riders of both sexes display their glossy steeds and horsemanship. Some ride sedately as if for conversation and air. Others dash by on as fine riding horses as are to be seen in the world.

Beds of flowers are disposed artistically, but not in a way to interfere with freedom and pleasure. Hyde Park is one of the most aristocratic, and, at the same time, one of the most democratic, parks in the world. All sorts and conditions of people are admitted freely and are kept in perfect order. Of late years it has been the scene of many workingmen's outdoor meetings gotten up as a demonstration for or against pending political measures.

The entire park is surrounded by a lofty iron fence with nine gates adorned with statuary. At midnight they are closed, and quiet reigns within. See LONDON.

Hyder Ali, hī'der ä'lee (1728-1782), a distinguished soldier of India. He is considered the most formidable Asiatic rival the English have ever had in India. He was a Mohammedan descended from a fakir family. He never learned to read or write. He was the first native of India to arm a corps of sepoys with firelocks and bayonets. Macaulay calls him "a man born for conquest and command." This military adventurer rose from one position to another. In 1762 he made himself rajah, that is to say, king, of Mysore. His territory embraced 84,000 square miles and yielded an enormous revenue. He spent his time carrying on wars with surrounding princes and with the English. He brought the British empire in southern India to the verge of ruin. Only a half dozen fortified places remained under the British flag. His forces were defeated finally by the English commander, Sir Eyre Coote, in 1781. He was succeeded by his son, Tippoo Sahib, whom English historians consider an arrant knave, in rascality quite equal to his father, but without corresponding ability. After several wars with the British, he was killed in 1799. See INDIA.

Hyderabad, hī-der-a-bäd', or **Haidarabad,** hi-da-ra-bäd', the capital of a native state of Central India also called Hyderabad, or the Nizam's Dominions. The old city, founded in 1589, is now an important railroad center. The great bazars of the city, the Mohammedan mosque, and the Charshinar, a college located at the crossing of the four principal streets and built above four connected arches through which the streets pass, all serve to lend a picturesque air to the city. The River Musi is crossed by seven great bridges located in different portions of the city. The British government maintains there a resident officer to advise the nizam; his residence and the nizam's palace are both magnificent buildings. The population is about 500,000.

Not to be confused with this city is Hyderabad, the capital of the Sindh Division of Bombay, in northeastern India. The city is near the left bank of the Indus. It is important as a railway and manufacturing center. The population is about 70,000.

Hydra, a fabulous serpent infesting the Grecian lake of Lerna in Argolis. It had nine heads. If any one of these was cut off, two grew in its place. The destruction of this monster was one of the twelve labors of Hercules. The term hydra-headed is often applied to an evil which it is difficult to suppress. In zoölogy, the hydra is a small cylindrical animal of low organism found in cold and fresh waters. One end of the cylinder is attached to a suitable base, the other is surrounded by a whorl of tentacles which waft water containing food into the central cavity.

Hydra, a minute fresh-water polyp typical of one of the lower forms of animals famous for being able to reproduce any part of its body. If cut into pieces each piece will become a perfect polyp. This is due to lack of differentiation of tissues, there being no distinct nervous or circulatory system. The hydra is visible to the naked eye—it is of the size of sewing cotton—and lives on the under side of submerged stems and leaves. Its tube-shaped body is very retractile; one end of it holds onto the stem or leaf, while the other swings to a new position. In this way it accomplishes a slow movement which enables it to forage for its food of

tiny crustaceans, which become paralyzed when in contact with the five or eight long tentacles, armed with nettling cells buried in the skin, with which the mouth at the upper end of the body is surrounded.

Hydrangea, hī-drăn′jē-a, an ornamental shrub of the saxifrage family bearing large clusters of showy flowers. The most interesting species of hydrangea bears flowers in great clusters a foot or more in length, and broader in proportion than the well-known lilac plume. The peculiar thing about them aside from their great size, is that the flowers change color from a greenish white to every shade of lavender, soft brown, and rose; if cut and kept in the house they will retain their beauty throughout the winter.

Hydrate, in chemistry, a compound of a class which may be regarded as formed upon the same type as water, or by the substitution of a metallic atom, or a basic radical, for one of the atoms of hydrogen in water, as potassium hydrate, ammonium hydrate. A substance containing water in solution is sometimes called a hydrate, and its crystals are called hydrated crystals, especially when it is desired to distinguish them from the anhydrous crystals of the same substance. Many chemists use the term hydrate as synonymous with hydroxide, but others reserve the term hydroxide for basic compounds. Thus the term sodium hydrate is sometimes applied to caustic soda, which is extensively manufactured, especially for soap-boilers' use, and is more commonly called sodium hydroxide. Potassium hydrate and calcium hydrate are also often called by chemists potassium hydroxide and calcium hydroxide. The hydrates of metals are true chemical compounds, but other so-called hydrates are merely aqueous solutions of various substances.

Hydraulics, the term applied to that branch of engineering which treats of the motion of liquids, the laws by which it is regulated, and the application of these principles to machinery, marine engineering, etc.

The science of hydraulics is brought to bear in many ways in industry. One notable example is hydraulic mining, which is a method of attacking loose gravel or auriferous banks of earth, and bringing the material into sluices. This method has been extensively employed in California and other gold regions, especially those of Australia. The essential feature of the method is that the gravel is broken up and washed down into the head of the sluice by one or more powerful jets of water, thrown upon the bank and used in such a way as to furnish a current of sufficient velocity to carry the debris down into the sluice. The volume of water used is often very large, and the delivery from the pipe takes place with great velocity, the water being under a heavy head. The diameter of the stream as it issues from the pipe is sometimes as much as 6, 8 or more inches, and the pressure from 100 to 200 cubic feet per inch. One form of apparatus for washing down a bank containing minerals is called a hydraulic giant.

Hydraulic engineering is a special branch of civil engineering concerned with the construction of waterworks and hydraulic machinery, and the improvement and control of streams, navigable waters, and canals. The hydraulic ram and the hydraulic press are separately described. In gasworks, a hydraulic main is a large iron pipe partly filled with water, into which all the pipes bringing the raw gas from the retorts enter, dipping below the water, which forms a seal. The main serves as the first purifier of the gas for use, and also to convey the crude gas to the condenser. Hydraulic lime is a species of lime that hardens in water, or which can be used for making hydraulic cement. A hydraulic jack is a lifting apparatus operated by means of some liquid, usually oil, acting against a piston or plunger, the pressure on the liquid being produced by a force pump. A hydraulic brush is a brush at the end of a long handle, the handle serving as a pipe to convey water to the brush from a hose, or acting as a syringe.

Hydraulic Press, a machine for exerting great pressure, whose operation depends upon Pascal's law for the transmission of liquid pressure. A small piston

worked by a lever, when forced into a vessel of confined water, exerts a pressure which acts upon a larger piston with a force proportional to the greater area. Thus with a small piston one inch in area, and a large one of one hundred inches, the force will be multiplied one hundred times.

Hydraulic Ram, an engine for raising a small amount of water to a higher level by suddenly arresting the flow of a larger stream. An air chamber and valves are essential parts of the machine. These rams may be used when the source of water is below the level of the place where it is required. From the fact that but a small part of the water is really elevated, the machine is uneconomical, and can be used to advantage only when the supply of water is large compared with the amount needed.

Hydrocarbons, the term applied in chemistry to compounds of hydrogen and carbon. The hydrocarbons are an exceedingly large and important group of compounds, and with their derivatives form the subject-matter of organic chemistry. They have great commercial value, as they form the principal ingredients of petroleum, coal gas, india rubber, etc. They are obtained from various organic substances by destructive distillation.

Hydrofluoric Acid, an acid obtained by distilling a mixture of fluor-spar with sulphuric acid. It has an intensely irritating, suffocating odor and a very strong affinity for water, acts energetically on glass, and is most destructive to animal matter. It comes on the market as an aqueous solution in gutta-percha or "ceresin" bottles, and is used for etching glass, as well as for antiseptic purposes. Great care must be taken in working with this acid, for its vapors are very poisonous, and even when diluted with more or less water, it causes swellings on the skin that heal with considerable difficulty.

Hydrogen, hi′drō-jĕn, an element in the form of a gas, discovered in 1766 by Cavendish. It is without color, smell, or taste. It is not poisonous. Hydogren is the lightest substance known. A balloon filled with hydrogen and set free will be forced upward with a bound by the heavier surrounding air. The weight of hydrogen is taken as a standard for gases. Thus we say the weight of hydrogen is 1 and that of oxygen 16. It may be burned in air, producing water. Hydrogen is difficult to confine. It passes through a stone jar or a brick or an ordinary plastered wall. In 1878 it was liquefied and frozen free, that is to say, uncombined. Hydrogen occurs in enormous quantities in the sun. It is found free in the openings of volcanoes and in certain salt mines and gas wells. It usually occurs in combination with other elements. It forms a trifle over one-ninth of water by weight. In addition to its presence as part of moisture, hydrogen enters into the tissues of all animal and plant life. See OXYGEN; WATER; GAS.

Hydrogen Peroxide, as commercially known, a compound resembling water in appearance, but having an atom more of oxygen in each molecule. Hydrogen dioxide, as it is also called, is, chemically considered, more logical. This excess of oxygen is readily given up, and the various uses to which the peroxide is put depend upon this free oxygen. For instance, it is used as a bleaching agent particularly for animal products such as hair and feathers. The term "peroxide blonde" as applied to one with bleached hair, indicates one use of this compound. Its most extended use is as a common household antiseptic, for gargles, mouth washes, nasal douches, and for sores or ulcers in destroying pus or preventing its formation.

Hydrom′eter, an instrument for determining the specific gravity of liquids. It depends upon the law that a floating body displaces an amount of liquid equal to its own weight. Its most common form is a graduated glass tube with a large bulb near the lower end, below which is a smaller bulb filled with shot or mercury to make it stand upright. The lighter the liquid, the lower will the instrument sink. The density of the liquid can be read directly from the scale. Special forms for different liquids are often used, as acoholometer, lactometer, etc.

Hydrophobia, hī-drō-fō′be-a. See RABIES.

Hydrostatics. See DYNAMICS.

Hydrotherapy, the use of water in various ways and at various temperatures for therapeutic or remedial purposes; also called hydrotherapeutics. From the most ancient times water has been highly regarded as a remedial agent, and has been used in the treatment of many forms of disease. Hydrotherapy employs water for both internal and external use, including the wet compress, the douche bath, partial baths of all kinds, the sweating process, and the wet sheet, together with the copious drinking of pure water. The water cure, so called, was introduced as a distinct form of treatment for disease by a Silesian named Priessnitz, about 1820, and the principles of modern hydrotherapy were laid down in 1883 by Dr. Winternitz of Germany. It has been extensively practised in the United States.

Hyena, hī-ē′na, a brownish gray flesh-eating animal about the size of a dog. It belongs to a distinct family which has many characteristics of the cat and the dog. There are several species. The common striped hyena is native to northern Africa and southern Asia as far inland as Persia. It has long, erect ears, prominent eyes, low hindquarters and high shoulders, and a shaggy, bristling mane. Its teeth and paws have a tremendous strength, and are capable of breaking the bones of an ox. It has an offensive odor. See JACKAL.

Hygiene, the science of health. Nowadays, surrounded as we are by every sanitary convenience, it is hard for us to realize that only for the past hundred years or so have men grasped the importance of studying hygiene. This is due largely to the fact that it could progress only hand in hand with medicine which has made its rapid strides during the last century. But while medicine aims to cure disease, hygiene aims to prevent it. Hygiene falls into three natural groups: hygiene of the community, of the home, and of the individual.

Public hygiene is cared for by the boards of health established in nearly every village, county, city and state. They aim to improve sanitary conditions and to prevent the spread of infectious diseases. Their position is a difficult one, for they oftentimes have to overcome people's prejudices, but the service such boards have rendered to public health can not be over-estimated.

Home hygiene is largely a matter of proper ventilation plus ordinary cleanliness. Where the house is connected with a sewer, it is a simple matter to keep it free from infection by pouring disinfectants down the drains. If there be no sewer, care should be taken not to throw dishwater or other refuse near the house, for such accumulations breed disease. All receptacles for waste should be cleaned thoroughly and frequently with boiling water and lye or other disinfectant. As to ventilation, too much fresh air is an utter impossibility 3,000 cubic feet an hour for each person being the normal amount required. No room should be without a constant change of air day and night.

Probably no matter except personal cleanliness is as important to individual health as kind and quality of food. No general rules can be laid down in this respect, for a diet that agrees perfectly with one person may disagree violently with a second. Each person can discover what best suits him by a little attention to the effects of different foods. Cleanliness of teeth, hair, nails, and person is essential to the best health. The matter of bathing, however, is sometimes overdone. A daily warm bath is weakening, though a weekly one is necessary, and two or three a week desirable. Most people are benefited by a daily cold bath; if the cold dip is too severe a shock to be easily overcome by the brisk rubbing which should always follow, usually a sponge bath can be substituted.

Hygrom′eter, any device for determining the humidity of the atmosphere. Many such are mere hygroscopes simply indicating whether there is considerable moisture present or not. Certain chemicals change color with absorption of moisture, as cloth soaked in cobalt nitrate, blue when dry, becomes pink when moist. Others, as sodium hydroxide, deliquesce. A human hair, cleansed with an alkali, contracts and expands with changes in atmospheric moisture, and can be used for rough determinations. A gelatine spiral with pointer attached will indicate in a general way the moisture conditions. A given quantity of

air may be drawn through a tube of calcium chloride previously weighed, and the increase of weight due to water removed may be determined. The humidity is found practically by getting the dew-point first, either by the evaporation of some volatile liquid as ether, or by the wet and dry bulb thermometer method. The wet bulb thermometer stands at a lower temperature due to evaporation, and by means of the difference between the two, with the aid of tables prepared for the purpose, the humidity is easily found.

Hymen, hī′mĕn, in Greek mythology, the god of marriage. One account makes him the son of Bacchus and Aphrodite; another account names Apollo as his father and one of the muses as his mother. For love of a maiden, Hymen dressed himself in woman's attire and went on a religious pilgrimage in a company of women. He was the means of saving the party from a band of pirates. As a natural result he married the maiden and came, in time, to be deified as the god of marriage. He is mentioned first by the poetess Sappho. In art he is represented as a boy, with wings and a garland. He is larger than Cupid. He carries a veil for the bride in one hand and a torch with which to light the household fire in the other.

Hymn, hĭm, a religious ode or poem. In a somewhat narrower sense, a hymn is a rhythmical production expressive of praise, adoration, or spiritual meditation, and designed to be sung by a company of worshipers. The word hymn is Greek. It was used by the ancients to signify a song in honor of gods, heroes, or famous men, sung or recited on some solemn or joyful occasion. There are two collections of Greek hymns known as the hymns of Homer and the hymns of Pindar. The *Zend-Avesta,* the scriptures of the Persians, and the *Rig-Veda* of the Hindus consist almost entirely of hymns.

Christian hymnody has its origin in Hebrew sources. The most noted collection of hymns in existence is that known as the *Psalms of David* and forming one of the books of the Old Testament. The word psalm, formerly used as synonymous with hymn, is now restricted for the most part to this collection. The book consists of 150 psalms or hymns. In the original Hebrew these were metrical compositions. They formed the hymn book of the Jewish nation, under the common name of "The Book of Praises." Doubtless these hymns formed an important part of Hebrew worship. In the New Testament we read of the apostles singing a hymn at the institution of the Lord's Supper. St. Paul and Silas sang in prison at Philippi. The singing of hymns is mentioned in several of the epistles.

The Psalms have been translated into English verse and in this form have been long in use in the Scottish church. The great hymns of the early Christian church are in Greek or Latin. The Roman Catholic church, in particular, is the custodian of a series of hymns accompanied by music of equal merit. Perhaps the most celebrated is the "*Te Deum,*" so called from the first line "*Te Deum laudamus,*" We praise thee, O God. The authorship is unknown but is ascribed often to St. Ambrose. This hymn is still sung in the Roman Catholic church, and the English translation forms a part of the regular morning service in the Church of England and the Protestant Episcopal churches of America. Another celebrated Latin hymn is "*Dies Irae.*"

Luther, the leader of the German Reformation, was a lover of music. He wrote thirty-seven hymns. The best known is a paraphrase of the forty-sixth psalm, "*Ein Feste Burg ist Unser Gott,*" A mighty fortress is our God. Carlyle says it is a "sound of Alpine avalanches"; Heine calls it the "Marseillaise of the Reformation." The Church of England has contributed noted hymns. Like those of the Roman Catholics and the Lutherans, they are too numerous to mention. The Presbyterians, the Methodists, and other denominations have done their full share. Some of the best known names of hymn writers are those of Cardinal Newman, Henry E. Lyte, Frederick Faber, Horatius Bonar, Charles Wesley, John Wesley, Isaac Watts, William Cowper, Thomas Moore, Bishop Doane, Richard Baxter, Reginald Heber, Sabine Baring-Gould, Reverend John Keble, and Sarah F. Adams. It seems fitting to mention in this connection the tunes to which favorite hymns are sung. Many of these are so

closely associated with the words that the one invariably suggests the other. The fitness of the music to the sentiment of the hymn itself has been, doubtless, an important factor in making permanent the popularity of many hymns.

Although the word hymn is defined as a religious song, a distinction is noticeable in the common use of the words hymn and song as applied to metrical compositions of a religious character. The word hymn designates those songs only which are of a serious nature, which express depth of feeling, and possess a certain majesty of movement. Bishop Doane's "Ancient of Days" is a hymn in the best sense of the word, and the older songs, "Nearer, my God, to Thee," "Lead, Kindly Light," "Abide with Me," are also hymns. But we give the name of songs instinctively to "Yield Not to Temptation," "Work, for the Night is Coming," and "What a Friend We Have in Jesus."

Hymns, National. Though patriotism, like every other inspired feeling, has expressed itself through the medium of music for ages, there have been no representative national songs until rather recent times. In the commonly accepted use of the term, a national hymn is the song adopted by a country for use on public occasions, such as the national holiday, and usually it is the outgrowth of a nation's history. A few of the more important national hymns and songs are given in the list which follows:

Austria, *Gott erhalte unsern Kaiser,* words by Haschka, music by Haydn; Belgium, *La Brabanconne,* music by F. Campenhout; Bohemia, *War Song of the Hussites;* Denmark, *Kong Christian stod ved höjen mast* (*King Christian Stood Beside the Mast*), words by Evald, music by Hartmann; France, *La Marseillaise,* words and music by Robert de Lisle; Germany, *Die Wacht am Rhein,* by Schneckenburger; *Heil dir im Siegerkranz,* (Pr.) words by Heinrich Harries, air, *God Save the King;* Great Britain, *God Save the King,* origin uncertain; Holland, *Wien Neerlandsch Bloed,* and another, *Wilhelmus van Nassouwe;* Hungary, *Isten áld meg a Magyart,* (*God Bless the Hungarian*); Italy, *Royal March,* air by Gabetti; Norway, *Sang for Norge* by Björnson; Russia, *Bozhe Zaria Ckrany (God Protect the Czar)* words by Joukowsky, music by Lvoff; Sweden, *Ur swenska hjetans djup en gäng;* Switzerland, *Rufst du, mein Vaterland,* air, *God Save the King;* Canada, *The Maple Leaf;* the United States, *The Star Spangled Banner,* words by Francis Scott Key.

See MARSEILLAISE; FRANCIS SCOTT KEY; GOD SAVE THE KING.

Hypatia, hī-pā′shĭ-a, a Greek woman philosopher. She was born in Alexandria about 350 A. D. She became an instructor in the great school there, and is said to have possessed eloquence, as well as rare modesty and beauty. Her classroom was crowded with students over whom her lectures had great influence. In the factions that arose among the early Christians of Alexandria, she became the victim of a fanatical mob of monks. She was torn from her chariot, dragged to a Christian church, stripped, cut to pieces with oyster shells, and burned piecemeal. Charles Kingsley has made her the heroine of a historical novel, *Hypatia.*

Hyperbola. See CONE.

Hyperbole, hī-per′bō-le, a rhetorical exaggeration. Hyperbole goes beyond the literal truth in order to make a statement more impressive or piquant. It must be used sparingly. The following examples will give a better idea of hyperbole than would be accomplished by an extended discussion.

Tired to death.

Swift as lightning.

Waves running mountain high.

A tongue that should move the stones of Rome

The rescued land
Sent up a shout of victory from the field,
That rocked her ancient mountains.

Why, man, he doth bestride the narrow world
Like a Colossus, and we petty men
Walk under his huge legs and peep about
To find ourselves dishonorable graves.

In '96 the apple crop of Central New York was so abundant that apples grew on scrub oaks and wire fences, is an instance of colloquial hyperbole.

Hyperborean, hī-per-bō′rē-an, in Greek mythology, one who lived beyond Boreas, or the North Wind. According to Greek legend, the Hyperboreans lived so far north that they were beyond the cold winds of winter and enjoyed a fruitful land of per-

petual sunshine. They were free from care, disease, and war. Life lasted for 1,000 years, and was spent in constant enjoyment and the worship of Apollo. After the age of legend passed away the Greeks gave the name to the barbarians living north of them. In modern usage, the term is equivalent to Arctic. The Eskimos, for instance, are spoken of as a hyperborean race. See ELYSIUM.

Hyperion, hī-pē′rĭ-on, in Greek mythology, one of the Titans, son of Uranus (the sky) and Gaea (the earth). He became the father of Helios (the sun), Selene (the moon), and Eos (the dawn). Hyperion was the original sun god and is represented as gloriously bright and beautiful. In astronomy, the name Hyperion is given to one of the satellites of Saturn. Longfellow has given the name *Hyperion* to a romance which he published in 1839. It is an account of the travels of a young man through foreign countries, and is interspersed with legends, poems, and philosophical discourses.

Hypnotism, hĭp′nō-tĭzm, artificial sleep or artificial somnambulism. It resembles sleep in that the person hypnotized appears unconscious, is insensible to most sense impressions, and, on being aroused, remembers little or nothing of what has occurred while he was in the hypnotic state. Hypnosis is, of course, an abnormal condition. Hypnotism closely resembles mesmerism, and the terms are used often synonymously; but hypnotism, as understood at the present time, differs theoretically from mesmerism, whose supporters claimed that the mesmeric condition was induced upon the subject by an emanation, called animal magnetism, from the person of the operator. Of late years extended researches in the subject of hypnotism have satisfied investigators that no magnetism or force of any kind is transmitted to the subject from the operator, but that hypnosis is a mental condition purely. It is claimed even that it is an entirely natural condition. In hypnotic sleep, while apparently unconscious and to a degree insensible, the mind of the subject is more or less active, and the nervous system keenly susceptible to certain impressions. The operator controls to a great extent the volition of the subject. He may influence him to play an assumed part, the subject acting apparently in the firm belief that he is in reality the individual he has been told to represent. It is, however, an entirely incorrect use of the word, hypnotism, to apply it to the mental influence exerted or thought to be exerted by one individual over another while both are in a normal condition. Hypnotism implies sleep. The human mind is always more or less susceptible to suggestion. In the hypnotic state, it is peculiarly so. When awake, the will controls measurably the effect of any suggestion the mind receives. While in the hypnotic state the will is dormant, and the suggestion seems to make its impression without any influence from the will of the subject.

Hypnotists recognize as many as nine degrees of hypnosis. As the sleep deepens, the self control of the subject decreases; but usually the patient is more susceptible to suggestion in the lighter than in the deeper degrees of sleep. Authorities claim that no person can be hypnotized against his own will, and that there is no danger of a patient becoming permanently subject to the will of the operator, nor of an operator being able to induce a subject to acts of crime by hypnotic suggestion. It is certain, however, that an operator can more easily induce hypnotic sleep the second or third time in any patient than he can at the first attempt. Beyond question, in the first instance, such sleep cannot be induced without the patient's consent.

The method by which hypnosis is induced varies somewhat. It is usually verbal. Sometimes the subject is asked to fix his eyes on a bright object, as a light above his head. Often the operator uses his hands to make slight passes before the eyes of the subject. Hypnotism is used by many reputable physicians to relieve pain and to cure cases of intemperance and the drug and tobacco habits. Undoubtedly, it is, in the hands of a skilled operator, a safe and beneficent form of cure. It is as unsafe for an amateur to experiment with hypnotism, as for an uninformed person to experiment with drugs.

Hyssop, hĭs′sŭp, a term of uncertain application. The garden hyssop is a bushy herb of the mint family. The scriptural

hyssop, "that springeth out of the wall," and that was used in sprinkling the people for their purification, may or may not have been a similar plant. It is thought by some scholars to have been the caper-bush.

Hysteria or **Hysterics,** a diseased condition of the nervous system, arising from a variety of causes and attended by a variety of symptoms. It is more common in women than in men, partly because woman is naturally more emotional than man and partly because her education and mode of life tends to make her susceptible to nervous affections. An isolated attack of hysteria may follow severe nerve strain. Its symptoms are a seeming lack of control of the emotions. The patient will laugh or cry and be unable to stop. The first aid in such a case is a copious drink of cold water, taken slowly. This will often be sufficient to quiet the patient, and if rest and relief from strain is secured, no recurrence need be looked for. Hysteria is in chronic cases a disease of a serious nature involving brain and spinal cord. The symptoms may include neuralgic pains, convulsive attacks and hallucinations of all sorts. Such conditions must be treated under the direction of a physician.

Nervous women, especially if anaemic, form sometimes what seems an hysterical habit. They are subject to emotional attacks, frequently of a convulsive nature, without adequate provocation. If these attacks are brought on by anger, jealousy, disappointment, fright, anxiety, etc., the patient often can be brought to effect her own cure. Such cases of hysteria seldom, if ever, occur when self-control has been taught from early childhood. The patient does not know that she can prevent the attacks. The sympathy she receives and oftentimes the indulgence of desires, the threatened thwarting of which has brought on the attack, serve to increase the frequency of the malady.

The best cure in such a case is for the person who has the patient in charge to explain to her the cause of her trouble and assure her that the matter is within her own control, stating that in the future she will be left to work her own cure. Then when an attack seems imminent, she should be given a drink of water and left entirely alone. A reliable physician is credited with the statement that no person ever had a violent attack of this form of hysteria when absolutely unattended.

I

Iago, ĭ-ä′gō, in Shakespeare's tragedy of Othello, the ancient or standard-bearer of Othello the Moor. The servant is jealous of the master's rank and power. He persuades Othello of the unfaithfulness of his wife Desdemona, and thus is the cause of the tragic death of all three, Othello, Desdemona, and himself.

Ibanez (ē-bah′-nyath) Vincente Blasco (1867-), one of the best known of the modern Spanish authors, was born at Valencia. Señor Ibanez is considered one of the most revolutionary of the modern Spaniards, and his writings have largely taken the form of propaganda. He is at odds with many features of the social system of Spain (his *Blood and Sand* is a stricture on the Spanish national sport, bull fighting); and his is the voice loudest in protest in his often protesting district of eastern Spain. In his own country Señor Ibanez is considered a Socialist, but it is admitted that many of his books present realistically—justly—the social conditions of his native land, and thereby make apparent the need of many reforms. His best known works are—besides the one named—*Our Sea, The Fruit of the Vine, The Mayflower, The Cabin, The Four Horsemen of the Apocalypse, Woman Triumphant, The Dead Command, Sonnica* and *The Shadow of the Cathedral.*

Iberians, a short, swarthy, long-skulled race of western Europe. The name was given by the Greeks to the ancient inhabitants of Spain. Over most of southern Europe they preceded the Celts, by whom they were, in many districts, driven to the mountains or absorbed. They left their name in the Iberian peninsula—comprising Spain and Portugal. They are believed to have been related to the Berbers of northern Africa. They are now represented in relatively unmixed blood, by the Basques and the Corsicans. The Welsh are believed to contain a considerable element of Iberian blood. See BASQUES.

Ibex, ī′bĕks, a wild goat. There are several species found in the mountain ranges of Europe, Asia, and Africa. The common ibex of the Caucasus, the Alps, and the Apennines is a brownish gray animal about 4½ feet long and something less than three feet high. It is a fine mountain climber, like the chamois in its habits, with a pair of large backward-curving horns that sometimes attain a length of three feet. It is, of course, a game animal, attaining a weight of perhaps 200 pounds. See CHAMOIS.

Ibis, ī′bĭs, a family of wading birds allied to the stork, heron, and crane. Four species are known in North America, the white, the scarlet, the glossy, and the white-faced glossy ibis. The white ibis breeds in flocks as far north as Indiana. It frequents mud flats and lives on frogs, snails, and small fish. The nest is made of weed stalks and coarse grasses, in bushes, trees, or reedy marshes. The birds fly in close rank, like a moving cloud of animated white. The scarlet ibis, once known in Florida, must be sought along the reedy shores and on the islands of the Orinoco. The glossy ibis is a bird of the West Indies. It is seen occasionally in the Gulf States. The white-faced glossy ibis, a rich chestnut-colored bird twenty-four inches in length, is found from Texas southwestward. Our so-called black and white wood-ibis, forty inches in length, is a sort of stork. The sacred ibis of the Egyptians was thought to symbolize the light and shade of the moon, while its body represented the heart.

Ibsen, ĭb′sĕn, **Henrik** (1828-1906), the foremost dramatist of Norway. Although intensely Norse in his writings and sympathies, it is doubtful whether he had any Norwegian blood in his veins. His great-great-grandfather, Peter Ibsen, was a Danish sea captain who settled at Bergen and married a German. Of the three succeeding Ibsens, one married a Scotch lassie; two married Germans. Ibsen's father married the daughter of a wealthy German merchant at Skien and himself settled down into the mercantile business. Here Henrik was born March 20, 1828. Skien was a simple, wooden village of about 3,000 people. Among Henrik's earliest recollections, so he tells us, was the marketplace and the church with high steps and noteworthy tower facing it. The town pillory, the town hall and the lock-up, the madhouse, and the school buildings were arranged

around this square. Among other juvenile recollections, Ibsen speaks of a "white, stout, heavy-limbed angel with a bowl in his hand, on week-days suspended high up under the roof of the church, but on Sundays, when children were to be baptized, lowered gently into our midst." He tells, also, of losing a coin—a christening gift—through a crack in the home floor. Boards were pulled up and search made, but the coin was not recovered. Young Henrik was scolded so thoroughly, so he relates, that for months, whenever he saw the village policeman coming toward the house, he scuttled away and hid under the bed. He was not much of a hand for outdoor sports, but on St. John's Eve joined other boys in begging, borrowing. and stealing tar barrels with which to make a huge bonfire.

While other boys were playing Ibsen was fond of making cardboard men and women, and setting them up in postures as though acting. He also acquired quite a reputation for magic. This he effected by means of a large dry goods box, inside of which he bribed a younger brother to hide and pull the strings. In this way, apparently by means of wise incantations, he made his Punch and Judy figures answer all sorts of questions, ridiculous and otherwise. The lad inside the box made the figures nod or shake their heads according to the exigencies of the occasion. It is said that Ibsen succeeded in guarding the deception well.

Ibsen gathered the best of literary material, that is to say, local material, at first hand. He attended the public and Latin school of his native town. His father having failed in business, he was apprenticed to an apothecary in Grimstad, a shipping town of about 1,000 people. Here Ibsen gathered much of the material afterward used in his dramas. There was but one drug store, one barber shop, and one inn. The conversation was confined largely to such thrilling questions as to whether such and such a sloop had sailed, and what might be the character of its cargo. The apothecary's shop is the town exchange, where the idlers gather. "Everyone knows his neighbors, inside and out; no jot of a man's private affairs is concealed. And they all salute one another, the richest man gets the lowest bow, the next richest the next lowest, and so down the scale to the common laborer, who only gets a nod, while he himself stands respectfully, hat in hand." The well dressed stranger is received with courtesy, for none can tell how great a personage he may be.

Ibsen was a young fellow of intensely democratic ideas. He chafed against the restraints of society. He was willing enough to behave himself, but he did not want to be required by society to do so. Public sentiment irked him. He felt that it was a tyrant requiring the individual to do this or that, whether he would or not.

While studying Cicero's *Orations* and Sallust's *Catiline* with a view of a future examination as an apothecary, he became impressed with the idea that Catiline was a persecuted hero. Instead of taking Cicero's and Sallust's view that Catiline was a desperate, unprincipled adventurer, the prey of unholy passions, he idealized him as

A man whose heart is stirred in freedom's cause,
The foe of all injustice and all wrong,
Friend of the feeble, crushed by unjust laws,
And filled with courage to o'erthrow the strong

In fact, during his whole life Ibsen was at war with the authorities of church, state, and the well established notions that govern social intercourse. In 1850 he went up to Christiania to finish studying for his examination. Here he may have studied diligently, but it is evident that he gave the greater part of his time to the theaters and to politics. At all events he was never heard of as an apothecary.

He published a number of poems and wrote a number of plays that appear to have accomplished little for his pocketbook; but in one way or another he got forward. He was for five years director of the theater in Bergen. A group of patriotic Norwegians, among them Björnson, organized the Norwegian theater in Christiania and invited him to become its director, this in 1857. It was the purpose of Ibsen and his friends to create a Norwegian stage, on which Norwegian subjects should be treated by Norwegian dramatists and represented by Norwegian actors. Although the project failed after a time for want of financial support,it had a prodigious effect on the national spirit. It would not be going too far to say that the separation of Norway and Swe-

den in 1905 may be traced to the work of Ibsen and his friends in Christiania. During the Christiania period of his life Ibsen had a small salary from the government, which later was changed to a pension permitting him to travel.

His later years were spent chiefly in Germany and Italy. He enjoyed a comfortable income from his dramas and the sale of his books. Norwegians consider *Peer Gynt* and *Brand* his greatest poems. The former is sometimes styled the "Scandinavian Faust." Of his dramas, *The Pillars of Society* and *A Doll's House* or *Nora* are perhaps the most popular. The former follows up the hypocrisy of the principal personages in a small town such as Grimstad or Skien.

From the general tone of his writings and the sarcastic nature of his criticisms, Ibsen has been styled the "Scandinavian Carlyle." Critics who read him in the original say that his style is as crabbed as that of Carlyle, his meaning as difficult to pick out as that of Browning. He died at Christiania May 23, 1906, and was honored by a funeral at national expense.

QUOTATIONS FROM IBSEN.

Men of science should not be allowed to torture animals to death. Let them begin with journalists and politicians.

Unfortunately, our best thoughts have been thought by our worst rascals.

Our whole bourgeois society rests upon a soil teeming with the pestilence of lies.

Wish and will. Our worst offenses arise from the fact that we confound these two things.

There will be a new nobility. Not the nobility of gold or of money, of talent, or of knowledge. The nobility of the future will be the nobility of courage and of will.

The conscience is not something stable. It varies in different individuals and in different ages. . . . It is between the out-of-date and the up-to-date conscience that party struggles are waged.

SAID OF IBSEN.

He prepared a dose for a sick world, and he made it as nauseous and astringent as he could, for he was not inclined to be one of those physicians who mix jam with their jalap. There was no other writer of genius in the nineteenth century who was so bitter in dealing with human frailty as Ibsen was. By the side of his cruel clearness the satire of Carlyle is bluster, the diatribes of Leopardi shrill and thin. All other reformers seem angry and benevolent by turns; Ibsen is uniformly and impartially stern. That he probed deeper into the problems of life than any other modern dramatist is acknowledged, but it was his surgical calmness that enabled him to do it. The problem plays of Alexandre Dumas *fils* flutter with emotion, with prejudice and pardon. But Ibsen, without impatience, examines under his microscope all the protean forms of organic social life, and coldly draws up his diagnosis like a report.

Scarcely will a voice be found to demur to the statement that Ibsen let fresh air and light into the natural life, that he roughly but thoroughly awakened the national conscience, that even works like "Ghosts," which shocked, and works like "Rosmersholm," which insulted, the prejudices of his countrymen, were excellent in their result. The conquest of Norway by this dramatist, who reviled and attacked and abandoned his native land, who railed at every national habit and showed a worm at the root of every national tradition, is amazing. The fierce old man lived long enough to be accompanied to his grave "to the noise of the mourning of a nation," and he who had almost starved in exile to be conducted to the last resting-place by a parliament and a king.—Edmund Gosse.

An undersized man with very broad shoulders and a large leonine head, wearing a long black frock coat with very broad lapels, on one of which a knot of red ribbon was conspicuous. I knew him at once, but was a little taken aback by his low stature. His natural height was even somewhat diminished by a habit of bending forward slightly from the waist, begotten, no doubt, of shortsightedness and the need to peer into things. He moved very slowly and noiselessly, with his hands behind his back,—an unobtrusive personality . . . But there was nothing insignificant about the high and massive forehead, crowned with a mane of (then) iron-gray hair, the small and pale but piercing eyes behind the gold-rimmed spectacles, or the thin-lipped mouth, depressed at the corners into a curve indicative of iron will, and set between bushy whiskers of the same dark gray as the hair. The most cursory observer could not but recognize power and character in the head; yet one would scarcely have guessed it to be the power of a poet, the character of a prophet. . . . One would rather have supposed one's self face to face with an eminent statesman or diplomatist. — William Archer.

Ibycus, ĭb'ĭ-cŭs, a Greek poet of the sixth century B. C. He was born in Italy. The greater part of his life was spent at the court of Polycrates of Samos. Only fragments of his poems have survived. According to an oft repeated legend, Ibycus met death at the hands of robbers while on his way to attend the Isthmian games on the Isthmus of Corinth. At the time, Ibycus was in a grove sacred to Neptune, within sight of Corinth. A flock of cranes flew above his head. In his happy mood—for the god Apollo had filled him with poetic

inspiration—Ibycus greeted the cranes as fellow travelers. Soon he was beset by robbers and, being unused to fight, saw that he must die. No human being was near, but the poet called on the passing cranes to avenge his death. The body of the poet was found, but none to name the murderers. The people gathered sadly in the great theater at Corinth, open to the sky, as were all ancient theaters. They all had loved the pious poet; they mourned his loss, and desired the punishment of his murderers. The terrible chorus that impersonated the Furies appeared, their pallid faces ghastly in the light of their torches, serpents writhing about their heads. In their hymn they sang of woe to the evil doer who tried to hide his deeds and avoid just punishment. The innocent listened with undefined horror; the guilty with conscious terror. As the Furies left the theater a flock of cranes came into view above the heads of the people.

> Just then, amidst the highest tier,
> Breaks forth a voice that starts the ear:
> "See there, see there, Timotheus,
> Behold the cranes of Ibycus."

In an instant, the guilty man knew that he had revealed himself and his comrade. The hosts of people knew that the murderers had been discovered. Schiller has told the story in verse.

Icarus, ĭk′ă-rŭs. See DAEDALUS.

Ice, water in a solid state. Under ordinary conditions, water changes to ice at 32°F. and 0°C. In freezing, the molecules arrange themselves in hexagonal crystals, as may be seen by the examination of a snowflake. When exposed to the heat of the sun, ice not infrequently falls into six-sided needles or columns. One hundred volumes of water make 109 volumes of ice. Ice is lighter than water and floats, therefore, on its surface, protecting ponds and lakes from being frozen to a greater depth. Ice is far from being rigid. In fact, it is so fluid-like that on the slopes of mountains it runs down slowly, forming oftentimes enormous streams of ice, called glaciers. If a long slab of ice be supported at the two ends, the center will curve downward. A slight jar facilitates the formation of ice. If perfectly quiet, water will cool several degrees below the freezing point without solidifying; but a jar, which, no doubt, facilitates the rearrangement of the molecules, will turn it suddenly into ice. Under pressure sufficient to prevent expansion, water may be cooled far below the freezing point and yet remain a liquid. Sea-water freezes at about 32° F. The ice in some way drives down or excludes nearly all of the salt. The people of the Mediterranean early learned the use of ice in cooling drinks. They depended largely, however, on snow brought from the Alps and other mountain peaks.

Artificial ice has been produced for many centuries in oriental countries. Even at the present day the natives of the East Indies manufacture large quantities of ice. They dig a large, shallow pit and fill it level full of crushed sugar-cane stalks to secure perfect drainage. On these beds of dry cane they place shallow earthenware pans of water. The ware is so porous that the pans are no sooner filled with water than moisture appears on the outside. The evaporation of water, as is well known, absorbs immense quantities of heat. Evaporation takes place so rapidly on the outside of these dishes that, when the operation is carried on after nightfall, the water left in the dish is turned into a cake of ice. An establishment of this sort, described by a recent writer, contains 100,000 of these pans and is managed by 300 attendants. They draw water from a well and fill the pans in the day time. In the morning they go about with hooks and lift the cakes of ice from the pans and store them for use. It is necessary to grease the inside of the pan slightly to prevent the cake of ice from adhering to the earthenware. Farmers' boys have long followed a similar method of keeping water cool in the field. If the jug of water be surrounded by a wet bag or sack, the evaporation draws heat from the jug and keeps its contents delightfully cool.

The Australian traveler carries water in a cloth canteen. The small amount of water that escapes through the cloth and evaporates keeps the contents cool. It is even reported that railway companies take advantage of this method to hang cloth tanks of water on the rear platform of observation cars. The breeze created by the mo-

tion of the train evaporates the escaping moisture and affords the passengers a delightful drink. The plan seems plausible, at least.

On the same principle, of evaporation, ammonia is used to make ice. The details are too extended for description. In brief, cakes of ice are frozen somewhat like ice cream in freezers. The surounding brine is chilled to a bitter coldness by pipes in which liquid ammonia is evaporated. The brine absorbs the heat from the water and ice forms. The ammonia is used over and over with little loss. Artificial ice costs about $10 a ton at retail in Chicago (1923). Very naturally, artificial ice is used in warm countries to which the importation of natural ice would be expensive.

The first ice factory in the United States was established in New Orleans in 1866. The extent to which ammonia-made ice is used in the United States may surprise the reader. There were, in 1920, over 2,860 plants making artificial ice in the United States, with over 30,000 employes and a product valued at $137,000,000. If we take cold storage warehouses into account, nearly half of the ice used in the United States is made by artificial means. Artificial ice is made in the form of briquettes. Throughout the Southern states ice is packed in gunny sacks and shipped to the smaller towns with the utmost regularity. Housekeepers buy their daily brick of ice along with other supplies.

The number of wagons engaged in distributing city ice is very great. In New York and Brooklyn alone there are 1,500 ice wagons. They distribute 5,000,000 tons a year. Philadelphia requires half as much.

Natural ice is harvested at a cost of from twenty-five to eighty cents a ton. The harvest of natural ice is a very important matter in the colder states. The icemen of Maine and the Hudson River put up over 2,000,000 tons a year. The other ice states harvest as much more. The Canadian provinces also harvest large amounts of excellent ice. We used to export ice, particularly to southern Europe and the West Indies. In 1870 our exports of ice rose to 65,000 tons, but improved methods of making artificial ice abroad have reduced our exports to a merely nominal quantity. In seasons of scarcity ice is brought by ships from Norway to New York.

Harvesting ice is accomplished by a series of simple operations on frozen lakes, rivers and ponds, and gas-driven machinery for this purpose has lately come into use. Scrapers remove the surface snow, etc., and if necessary the surface may then be planed to remove impurities. Parallel grooves marking out blocks of suitable size are then cut in the ice by mechanical markers and plows, and the final grooves are deep enough to extend nearly through the ice. Saws may be used to complete the cutting, and free the rectangular blocks of ice, which are then floated to shore through channels provided for the purpose. Inclined elevators then usually lift the blocks into the icehouse, where they are packed close together, with sawdust or some other insulating material between the layers and around the outer walls of the icehouse, to minimize melting until the ice is removed for use.

Artificial ice-making and processes of refrigeration are the objects of an important industry, equipped with special machinery. Many hotels and apartment houses are now furnished with refrigerating apparatus. Artificial ice is now largely replacing the natural product throughout the United States and Canada.

See COLD STORAGE; GLACIER.

Ice, Artificial. See ICE.

Iceberg, a fragment of a glacier floating about in the sea. If a glacier on the coast pushes out into the sea faster than it wastes away, a mass of ice breaks off sooner or later and floats away. The floating ice is then called an iceberg. The icebergs of the North Atlantic are formed chiefly on the shores of Greenland. Some of the blocks measure a mile or more across, and are from 1,200 to 1,500 feet in thickness. As ice is lighter than water an iceberg floats like a chip, but it should be remembered that only the small end is above water, possibly one-tenth of the bulk. An iceberg extends five or six times as far beneath the surface of the water as it does above. The warm waters which prevail along the northwestern coast of Europe melt the icebergs before they drift farther south than 70° of north latitude. On the American coast

they drift as far south as the banks of Newfoundland. Seen in the daytime and in clear weather, icebergs are often very beautiful. Minarets and towers glitter in the sun like fairy work, but they are none the less a source of real danger to ships, especially in dark nights and amidst the fogs that prevail. As icebergs are formed on land their water is fresh and is often relied upon for use on board ship. An iceberg must be approached with caution, however, because splinters and slivers are likely to fall at any time. Although the North Pacific Ocean is approached by magnificent glaciers, icebergs are by no means so prominent as in the North Atlantic. The icebergs of the southern hemisphere, if we except the region of Cape Horn, seldom interfere with navigation.

Iceland, an island in the North Atlantic. The Arctic circle touches the northernmost points. The name is Danish, signifying a land of ice. It lies about 500 miles north of Scotland, 600 miles from Norway, and 250 miles from Greenland. It is of volcanic origin, being composed chiefly of tufa and basalt. There are still hot springs and at least one active volcano. The area is 39,756 square miles—almost exactly the size of Kentucky. The extreme width is not over 200 miles. Measured from headland to headland, the circumference is about 900 miles, the actual coast line being over 2,000. The southeastern coast is unbroken. The remainder is penetrated by bays and fjords, affording harborage. The interior is a sandy, stony, high upland of no value, having an average altitude of 2,000 feet. In places there are ice caps. One of these, the greatest elevation in the island, rises to a height of 6,466 feet.

The settlements are confined to a fringe of land about the deep bays and firths. The farms are in no instance over fifty miles inland. Agriculture is confined almost entirely to garden patches, the total area of which is not over 200 or 300 acres. Potatoes, turnips, carrots, and cabbages grow well. Nearly all the arable land is devoted to a kind of self-sown wild rye, making valuable hay. The uplands afford pasture for sheep, cattle, and horses. The Icelandic horse is a sturdy, shaggy animal weighing about 900 pounds. Though larger, it resembles the Shetland pony in many respects. The cat has, of course, been introduced. The Icelandic dog appears to be a cross between the Eskimo dog and the Scotch collie.

The shoulders of the hills and parts of the island are covered with a growth of willow, juniper, and birch, seldom exceeding twelve feet in height. Fuel is scarce. The flowers of the island are delicate and bright in color. Heaths abound. Several wild berries, related to our blueberries, are found in the moors and hills. Almost the only wild animal is the fox. Owing to its liking for young lambs, as well as the value of its pelt, it is hunted assiduously. There are over fifty kinds of water fowl, including the eider duck and the whistling swan. There are also forty other birds, among which are the Iceland falcon and an eagle. The ptarmigan is the only game bird of the interior. In places, the shores of the island are precipitous cliffs, 2,000 feet in height, inhabited by cliff-nesting waterfowl.

The inhabitants are engaged chiefly in fishing and caring for their stock. In July the entire population turns out to secure the hay crop. The rivers abound in salmon. Shoals of cod, haddock, and halibut hover about the coast and enter the bays. Owing to the influence of the gulf stream, the climate is far milder than might be expected. The air is clear, like that of Colorado. Mountains 100 miles away may be seen without difficulty.

Although the ports of Iceland are open to the world, commerce is largely in the hands of the Danes. The exports are whale and fish products, wool, eider down, feathers, sheep, and horses. The country is entirely dependent on outside sources for breadstuffs, groceries, tobacco, and liquors.

The island was settled by Norwegians at an early date. They found a small colony of Irish in possession. Christianity was introduced in 981. For centuries Iceland was an independent republic, a nation of hardy navigators, a period to which the inhabitants still look back with pride. In 1264 the island was annexed by Norway. In 1380 it passed under the control of Denmark. Home rule has been granted. The inhabitants are Scandinavians of Lutheran profession. There is little poverty

and less wealth. The largest income in the island is said not to exceed $1,500. The people have been noted for generations as readers. Although public schools have been established the children are taught largely at home. A small university is maintained at the capital. Books and periodicals are in great demand and are passed from home to home. Illiteracy is almost unknown. There is one policeman on the island. There are no saloons and no jails.

The Icelandic language is a subject of much interest to scholars. Chairs of Icelandic are maintained in a number of universities. The Gothic is the parent of Teutonic languages. In some respects the Icelandic tongue is more like the Gothic than is any other modern language. It is thus a more antiquated form than any other Scandinavian language. On the other hand, it has been modified more than the Scandinavian tongues, and in many respects resembles the English. It is, therefore, one of the most ancient, as well as one of the most modern, languages in Europe. During the period of national independence, Iceland developed a literature of its own. Proverbs innumerable, folk tales, songs of victory, elegies, history, and romantic works known as sagas, lives of kings, descriptions of journeys, and accounts of voyages form a considerable body of literature comparing not unfavorably with the riddles, rhymes, nursery jingles, ballads, and early chronicles of England. The masterpieces of Greek, Latin, German, French, and English literatures, as well as the entire Bible, have been translated into Icelandic.

The island has undergone many vicissitudes. Its conquest by Norway killed local pride and arrested development. In 1627 Algerian pirates visited the coasts, killing many of the inhabitants and destroying such property as they could not carry away. In 1707 nearly 20,000 people died of smallpox. In 1783 and the following years there were volcanic eruptions. Severe famines, the latest in 1824-5, have reduced the population. The population in 1920 was returned at 78,470. Reykjavik is the capital.

Icelandic Literature. See LITERATURE. See also EDDAS; SAGAS; SKALD.

Ichabod Crane, a Yankee schoolmaster in *The Legend of Sleepy Hollow* in Irving's *Sketch Book.* Ichabod is a suitor for the hand and inheritance of Miss Katrina Van Tassel. He has a startling adventure with the Headless Horseman and disappears forever from the neighborhood of Sleepy Hollow. See IRVING.

> The cognomen of Crane was not inapplicable to his person. He was tall, but exceedingly lank, with narrow shoulders, long arms and legs, hands that dangled a mile out of his sleeves, feet that might have served for shovels, and his whole frame most loosely hung together. His head was small, and flat at top, with huge ears, large green glassy eyes, and a long snipe nose, so that it looked like a weathercock, perched upon his spindle neck, to tell which way the wind blew. To see him striding along the profile of a hill on a windy day, with his clothes bagging and fluttering about him, one might have mistaken him for the genius of famine descending upon the earth, or some scarecrow eloped from a corn-field. —Washington Irving, *The Sketch-Book.*

Ichneumon, ĭk-nū′mŏn, a weasel-shaped animal of tropical countries. The name is Greek, meaning the tracker. The Egyptian species is somewhat longer than a cat, but is much more slender. It is an active, yellowish animal with black muzzle and paws. It is exceeding valuable for the destruction of the rats and mice that infest a grain-raising country, and especially for the deadly warfare it carries on with poisonous snakes. It follows along the shores, and limits the increase of the crocodile by digging up its eggs. It is known also as Pharaoh's rat. See MONGOOSE.

Ichneumon Fly, a family of two-winged insects. There are over 1,000 species of ichneumon flies, differing very considerably, but having in common a family characteristic of depositing their eggs in or on the larvae of other insects. Some species deposit their eggs on the bodies of caterpillars. The body of the female usually terminates in an awl-shaped egg depositor, which, in some species, is much longer than the body of the fly itself. Many species use the ovi-depositor as a drill. One in particular is able to locate larvae in a dead tree or twig accurately. It throws its drill up over its body in a long curve and hammers away on the wood until it has reached the larva within. It then deposits an egg in the body of the unfortunate grub, and

leaves it to hatch out and feed on its host. In this way ichneumon flies destroy countless millions of insect pests. They are as useful in their way as are the ichneumons of Egypt from which they are named.

Iconoclasts, in the history of the Eastern church, a sect bent on removing images from the service of the church. The term means image breakers. The Iconoclasts flourished during the eighth and ninth centuries. They interpreted the second commandment to forbid all artistic symbols, whether painted, engraved or carved. They held that the ignorant degraded symbols into idols. They rose in influence under the Greek emperor, Leo the Isaurian, by whom images were ordered out of the churches. Eastern mobs sacked the sacred edifices in religious fury, cutting canvas from frames, defacing artistic walls, smashing priceless statuary, and breaking carvings from the stone work. A great schism arose. The eastern and the western branches of the church separated. The Roman or western church resisted the iconoclastic movement and church art was preserved up to the time of the Protestant Reformation, when the vandal mob defaced and destroyed many valuable works, particularly in Germany, the Low Countries, and in Scotland. England also has much to regret at the hands of iconoclasts.

Idaho, a Rocky Mountain state of the American Union. To those traveling westward Idaho is the first state beyond the Rockies. Although presenting an irregular appearance on the map, the boundaries of the state may be drawn readily. The northern boundary is the 49th parallel, the southern boundary the 42nd. The western boundary is the 117th meridian, save that, in the center, the line follows the Snake River for 200 miles or more. The eastern boundary begins at the southeastern corner with the 111th meridian and ends at the British boundary on the 116th meridian. Across the interval between these meridians, the line follows the highest summits of the Rocky and the Bitter Root mountain ranges. Thus the southern part of the state occupies six meridian spaces, the northern extension but one. The general outline suggests a ham, trimmed square at the large end. The extreme length is 485 miles. The breadth varies from 50 to 300 miles. The area is 83,888 square miles, a little larger than Korea.

TOPOGRAPHY. Idaho is decidedly mountainous. The mean elevation is about 4,700 feet. The greatest elevations are in the northeast. They attain a height of over 12,000 feet, and are perpetually capped with snow. The state is drained almost wholly by the Columbia River. The waters of the southern four-fifths of the state reach the Columbia through its largest tributary, the Snake. There are numerous cataracts. The Shoshone Falls are 210 feet in height. The soil of the southern part of the state is volcanic in origin. There is one lava desert in the valley of the Snake having an area of 20,000 square miles. There are soda springs and hot pools in this region. Geologists have found it rich in fossils of animals once supposed to be peculiar to other continents. The remains of the elephant, mastodon, tapir and huge lizard-like animals have been found here. In this particularly arid region, the streams formed by the melting snows of the mountains lose themselves in the sands not far from the mountain ranges.

CLIMATE. The state has a wide diversity of climate, owing to the difference in latitude. The valleys and plains have a higher mean temperature than the highlands in the same altitude. The mean temperature of the northern part of the state is lower than that of the southern part. During the summer in some localities the theremometer may rise to 100°. These places have mild winters and the temperature seldom falls below the freezing point, but in the mountains the winters are severe. The northern part of the state receives an abundant rainfall due to the contact of the west winds with the mountains. The rainfall in the southern part is not sufficient for agriculture, and irrigation is necessary.

MINERALS AND MINING. Mining is the second industry in importance. The value of the annual output of the mines averages about $30,000,000. The chief products in order of their value are lead, zinc, copper, silver and gold. The largest lead and zinc mines are in the Coeur D'Alene

district, the chief copper-producing district lies in Custer County. There is also a rich copper belt in Adams County. Gold is produced in the northern and central parts of the state and most of the silver is obtained in the reduction of lead, zinc and copper ores. Valuable tungsten mines are in operation and a friable but very good grade of coal is found on the Wyoming border.

FORESTS. The northern part of the state contains one of the largest forests of white pine in America and this region is now the chief source of white pine lumber.

AGRICULTURE. Agriculture is the chief industry and the leading source of wealth. In 1920 15.7 per cent of the land area was in farms, and 54 per cent of this land was improved. About 63 per cent of all farms were operated by their owners. Wheat, hay, potatoes, oats and barley, in the order named, are the most important crops. Alfalfa is also raised, and sugar beets, there being eight beet sugar factories in the state. Live stock raising is an important branch of agriculture, and apples and other fruits are grown in large quantities.

IRRIGATION. Idaho ranks fourth among the states in her area of irrigated land, which exceeds 2,250,000 acres. The state is also noted for its extensive irrigation works. The Arrowrock Dam across the Boise River is 349 feet high with a cross length of 1.060 feet. There is a reservoir at Jackson Lake, and the mountain streams furnish abundant water power. The reservoir impounds enough water to cover 245,000 acres to the depth of one foot. The Salmon River Dam reservoir irrigates 260,000 acres. There is also a dam across the Snake River at Minidoka and another at Milner.

MANUFACTURES. The leading manufacturing industries in the order of their importance are lumbering, flour and grist mills, car and railroad shops, and printing and publishing establishments. The total value of manufactures is about $30,000,000 annually and about 18 per cent of this is lumber.

TRANSPORTATION. There are over 3,600 miles of railroad in the state. The Oregon Short Line with a number of branches serves the southern part of the state; the Northern Pacific and Chicago, Milwaukee & Puget Sound lines cross the central part of the state, and the Great Northern crosses the northern part. All the rivers are rapid mountain streams and there is but little water transportation. A Public Utilities Commission regulates railway and express rates.

POPULATION. In 1920 the population was 431,866 as against 325,504 in 1910, a gain of 32.6 per cent. The rural population was 72.4 per cent of the total, and the average number of inhabitants per square mile was 5.2. The largest cities are Boise, the capital, 21,393; Pocatello, 15,001; Twin Falls, 8,324; Idaho Falls, 8,064; and Nampa, 7,621.

EDUCATION. The University of Idaho at Moscow is at the head of the educational system. It was opened in 1892 and comprises colleges of letters and science, agriculture, engineering and law, and schools of forestry, mines and education. The faculty numbers over 100 and the enrollment exceeds 1,500. State normal schools are maintained at Lewiston and Albion and there is a technical institute at Pocatello. The public schools are well organized and the law allows the consolidation of school districts.

GOVERNMENT. The constitution was adopted in 1889 and over 20 amendments have been added. The legislative power is vested in a senate, and in a house of representatives which is composed of at least one member for each county but must never exceed three times the number of senators. Members of both houses are elected for two years. Sessions are biennial. The governor and lieutenant-governor are elected for two years. The Administration Consolidation Act of 1919 completely reorganized the civil administration, giving the state a consolidated form of government, locally known as the cabinet or commission government. The governor is at the head and he is assisted by nine commissioners, one each at the head of the following departments: Agriculture, commerce and industry, finance, immigration, labor and statistics, law en-

forcement, public works, and reclamation. The commissioners are appointed by the governor and, excepting those whose terms are fixed by the constitution, are removable by him.

The judicial system comprises a supreme court and district courts; the judges of both are elected by the people.

History. The Lewis and Clark Expedition explored a part of the region in 1805. However, with the exception of fur traders, there were few settlers prior to 1860. In that year gold was discovered around Orifino and a rush of fortune seekers followed. The Territory of Idaho was organized in 1863, and included Montana and most of Wyoming. Montana was separated in 1864 and Wyoming in 1868, leaving Idaho with its present boundaries. Early settlers were troubled by Indians, who were later pacified and retired upon reservations. The territory became a state in 1889. Since then its progress has been steady. Idaho furnished over 19,000 men for the World War, and its citizens oversubscribed each of its Liberty Loan quotas.

Statistics. The following are the latest reliable statistics to be had:

Land area, square miles	83,354
Water area, square miles	534
Forest area, acres	16,000,000
Irrigated area, acres	2,448,806
Population (1920)	431,866
White	425,668
Negro	920
Asiatic	2,180
Indian	3,098
Chief Cities:	
Boise	21,393
Pocatello	15,001
Twin Falls	8,324
Idaho Falls	8,064
Number of counties	44
Members of state senate	44
Member of house of representatives	65
Salary of Governor	$5,000
Representatives in Congress	4
Assessed valuation of property	$377,865,027
Bonded indebtedness	$3,880,750
Farm area, acres	8,375,873
Improved land, acres	4,511,680
Irrigated land, acres	480,000
Wheat, bushels	27,079,900
Oats, bushels	7,740,000
Barley, bushels	2,784,000
Sugar beets, tons	412,000
Wool clip, pounds	21,702,000
Domestic Animals:	
Horses	284,000
Mules	7,400
Milk cows	137,000
Other cattle	505,000
Sheep	2,623,000
Swine	240,030
Manufacturing establishments	922
Capital invested	$ 96,061,709
Raw material	$ 43,948,505
Operatives	13,917
Output of manufactures	$ 80,510,749
Output of flour and grist	$ 13,501,000
Copper, value	$ 491,000
Lumber products, value	$ 30,088,000
Zinc, value	$ 1,785,000
Gold, value	$ 459,000
Silver, value	$ 8,379,000
Lead, value	$ 22,292,000
Miles of railway	2,881
Teachers in public schools	5,282
Pupils enrolled	156,806

Iddings, Joseph Paxton (1857-), an American geologist, was born in Baltimore, Md. He was graduated in 1877 from the Sheffield Scientific School, Yale, taking post-graduate courses at Columbia University and Heidelberg. He was in the service of the United States Geological Survey from 1880 to 1892, and later in 1895. Then he became assistant professor and professor, successively, of petrology at the University of Chicago, remaining there until 1898. Mr. Iddings has made extensive explorations for the government of the United States, of which he has made reports in various publications. Among his writings are: *The Nature and Origin of Lithophysae and the Lamination of Acid Lavas; Of the Development of Crystallization in the Igneous Rocks of Washoe, Nevada,* with Arnold Hague and *Igneous Rocks.*

Ide, Henry Clay (1844-1921), an American statesman, governor of the Philippine Islands, was born at Barnet, Va. He was a graduate of Dartmouth College. He held several government positions, such as United States Commissioner to Samoa, and later Chief Justice there. While a member of the Taft Commission he helped to establish civil government in the Philippine Islands, of which he became Governor General in 1906. From 1909 to 1913 he was Minister to Spain. Mr. Ide was the author of several publications dealing with affairs in the Philippine Islands, such as land registration and internal revenue.

Ides. See CALENDS.

Idolatry, the worship of idols An idol is usually a carved figure resembling the figure of a person. The ruder the people, the ruder its idols. There are two sorts of idol worship; the worship of the idol by reason of godlike qualities which it is believed to possess, and the worship of idols as a means of approaching the deity or deities they are supposed to represent. A statue of a noted man, on the other hand, is an entirely different thing. While the erection of the statue is, no doubt, an outgrowth of idolatry, the statue is erected merely as a mark of respect and to keep in mind one whose qualities commend him. Idolatry appears to have prevailed among all savage nations. Idols were set up in groves and in temples more or less elaborate.

Although the Hebrews have given to the world a religion which is especially severe upon idolatry, the families of the Hebrew patriarchs themselves were not entirely free from idolatry or image worship. We learn that Rachel, Jacob's wife, had stolen "the images that were her father's," and that she put them in the camel's furniture and sat thereon that Laban might not find them. The idolatry of the surrounding people gave the prophets of Israel much trouble.

The worship of idols has ever been accompanied by bowing down in front of them, making presents, and offering sacrifices. Whenever communities were sufficiently organized to maintain a priesthood, the offerings to idols were necessarily large enough to maintain the priests. Idolatry is by no means at an end. Bejeweled idols of large proportions are still to be seen in the temples of India, and have thousands, we may say millions, of devotees. The most celebrated idol in the world is without doubt an image of Buddha in the temple of Lhasa, Tibet. In *The World's Work* for March, 1905, Landon, who accompanied Colonel Younghusband on a recent diplomatic mission, writes:

> The first sight is uncannily impressive. Before him are rows and rows of great butter-lamps of solid gold. Lighted by the tender radiance of these twenty or thirty beads of light, the great glowing mass of the Buddha softly looms out, ghost-like and shadowless. The crown is perhaps the most interesting of the many jewels. It is a deep coronet of gold, set round and round with turquoise, and heightened by five conventional leaves, each inclosing a golden image of Buddha and incrusted with precious stones. In the center, below the middle leaf, is a flawless turquoise six inches long and three inches wide, the largest in the world.

See ANCESTOR WORSHIP; BUDDHA.

Idyll, a short and highly finished narrative poem presenting a complete picture. The word idyl, or idyll, means "a little picture." The word is used sometimes to designate a short pastoral poem, but more properly speaking the idyll presents scenes of action rather than of pastoral quiet, and appeals to strong rather than to gentle emotions. The idyll belongs to the epic class of poetry as distinguished from the lyric and dramatic. Tennyson's *Idylls of the King* are the best examples of idylls.

Idylls of the King, a cycle of twelve poems by Alfred Tennyson, having as their subject the Arthurian legends. These poems were written at different times, the subject having been evidently in the author's mind during a period of over fifty years. The character of King Arthur had always appealed strongly to Tennyson. The idea of making him the center of a series of poems, which should typify the life of man as related to the contest between good and evil, was a matter of slow growth. In fact, it is probable that the full conception of the theme which binds these stories together and makes them a complete whole never came to Tennyson until most of the separate poems had, at various intervals, taken shape in his mind, been written, and given to the public. During the eighteenth century romance was decried, and the Arthurian stories were despised as childish and silly. Early in the nineteenth century Scott made romance popular again, and in literature it began to assume once more a place of importance. Malory's *Morte d'Arthur* was published in Tennyson's boyhood. That the stories connected with King Arthur had early attracted Tennyson's fancy is evinced by three lyrical poems,—*The Lady of Shalott,* a ballad later retold in *Elaine; Sir Lancelot and Queen Guinevere;* and *Sir Galahad.*

In 1842 *Morte d'Arthur* was published with an introduction representing the poem to be a fragment of an epic in twelve books.

This poem, with certain additions and slight changes, now constitutes the last "idyll" of the series, and is called *The Passing of Arthur.* For years the subject was untouched by Tennyson, at least so far as the world knows. Then in 1859 appeared four poems, *Geraint and Enid, Merlin and Vivien, Lancelot and Elaine,* and *Guinevere,* under the general title of *Idylls of the King.* Three years later the dedication to Albert, Prince Consort, was added. The first of these four poems was, in the final arrangement of the cycle, divided into two, *The Marriage of Geraint, Geraint and Enid.* In 1869 four idylls again appeared, bearing the title of *The Holy Grail and Other Poems.* These were *The Coming of Arthur, The Holy Grail, Pelleas and Ettarre,* and *The Passing of Arthur.* In 1871 *The Last Tournament* was published, and the next year *Gareth and Lynette.* In 1873 the idylls appeared in their present order in the library edition of Tennyson's poems, and the *Epilogue to the Queen* had been added. Finally in 1889 *The Idylls of the King,* including those already mentioned, with the addition of *Balin and Balan,* stood complete. Their order is as follows: *The Coming of Arthur; The Round Table*—(1) *Gareth and Lynette;* (2) *Marriage of Geraint;* (3) *Geraint and Enid;* (4) *Balin and Balan;* (5) *Merlin and Vivien;* (6) *Lancelot and Elaine;* (7) *The Holy Grail;* (8) *Pelleas and Ettarre;* (9) *The Last Tournament;* (10) *Guinevere,—The Passing of Arthur.*

Each idyll is a story complete in itself. Each one fills a particular place in the entire cycle which makes of the whole a perfect epic, fit to be ranked with *The Faerie Queene* and *Paradise Lost,* as it is frequently ranked by critics with whom it has withstood every test except that of time alone. Tennyson's Arthur is an ideal knight, "who reverenced his conscience as his king." He weds Guinevere, "the fairest of all flesh on earth," and in

> Twelve great battles overcame
> The heathen hordes and made a realm and reign'd.

He gathers about him the bravest and noblest knights who

> Are sworn to vows
> Of utter hardihood, utter gentleness,
> And loving, utter faithfulness in love,
> And uttermost obedience to the king.

The poems tell how these vows were kept and—broken; how, because Queen Guinevere failed to love "the highest," because of the untruth of the "noblest and the truest" knight, the great king failed in his purpose and the round table was dissolved.

Tennyson found his material in Malory's *Morte d'Arthur,* and in *Mabinogion.* He made the material his own, however, so that, as some one says of Shakespeare, "he is more original than his originals." There has been much discussion as to the allegorical meaning of this beautiful epic. Tennyson said himself that each reader must get his own lesson from it. The best way for a young person to read it is to think not at all of the lesson or the allegory. Read it for the story—for the beauty of the poetry. It is sure to be read again for the love of it. It cannot fail to elevate and inspire. If as a student of literature, one wishes to go deeper, the task, though by no means easy, will amply repay the effort. See ARTHUR.

Ignis Fatuus, ĭg′nĭs făt′ū-ŭs, a flame or light which on summer and autumn nights is seen sometimes to hover over swamps, stagnant waters, or graveyards. Many explanations have been given for these marsh lights, and it is quite possible that several different causes result in the quite varied appearance of the phenomena. Luminous insects, or phosphorescence of decaying vegetable matter may account in some cases for the light. Another theory is that phosphoretted hydrogen, a gas which is spontaneously inflammable, is produced where there is decaying animal matter and that its ignition causes the flames.

Ignis fatuus is known sometimes as Will-o'-the-wisp or Jack-o'-lantern. It was regarded formerly with awe by the superstitious who had many stories to tell of travelers decoyed to danger and death by evil spirits whose torches made these strange lights.

The words ignis fatuus are Latin and mean foolish fires. Figuratively the term is used to designate the foolish impulses and light motives which lead many people astray by their resemblance to something worth while.

Igorrote, a people or tribe living on several of the Philippine Islands. They were formerly wild and barbarous, and were

head hunters, but since the American occupation of the Philippines they are becoming civilized. Many of them are being educated, and some of the young men are members of the police force of the Philippines.

Iguana, ĭ-gwä′na, a large lizard of tropical America. The throat has a large dewlap and the back is covered with a spiny ridge. It is an arboreal animal and spends much of its time sleeping in the sun. It is entirely harmless, feeding chiefly on fruit or other vegetable matter. It is from three to five feet in length, over half of which, however, is tail. The natives take it by means of a noose attached to a pole. They value its flesh highly for food. Iguana steaks are sold in the Panama markets and are served in the restaurants. They are said to be tender and to have the taste of fried chicken. See LIZARD.

Ik Marvel. See MITCHELL, DONALD G.

Iliad and the Odyssey, The, Greek epic poems. The authorship of these poems is discussed in the article on *Homer*. These two poems are the most celebrated works in the literature of ancient Greece. By the Greeks, themselves, they were regarded as the final court of appeal on all questions pertaining to early history and religious doctrine. No man was educated who had not studied these poems. In the time of Socrates, there were Athenians who could repeat the whole of both poems. Each poem consists of twenty-four books. The *Iliad* has for its subject the *Wrath of Achilles*. Its action is confined to the tenth year of the Trojan War. The *Odyssey* deals with the *Return of Ulysses* from the Trojan War. These poems, either in parts or as complete wholes, were recited at various festivals. It is probable that the regulator of the poetical contests was finally responsible for reducing them to writing and arranging the various parts of the poem in order. Pisistratus is the one who is credited usually with this work. From the study of the poems themselves it would seem that the *Iliad* can scarcely have been the work of any one poet. The *Odyssey* is much more likely to have had a single author. The name of Homer has ever been mentioned as the author of both poems and will continue doubtless to be so used.

Ilium. See TROY or ILIUM.

Illinois. One of the north central-states of the United States, extends from the Mississippi River on the west to Lake Michigan on the east, and from Wisconsin on the north to the Ohio River on the south. The Wabash forms the southeastern boundary and the Mississippi separates the state from Iowa and Missouri. The greatest length of the state from north to south is 385 miles, its greatest width 218 miles, and its area 56,665 square miles. Illinois is the twenty-first state in the Union in area and the third in population.

SURFACE AND DRAINAGE. Illinois is one of the most level states in the Union. The highest point of land, 1241 feet, is in the extreme northern part of the state. The surface slopes gently toward the south and southwest; a low height of land divides the streams flowing into Lake Michigan from those flowing into the Mississippi, and south of the center of the state another height of land separates the streams flowing into the Wabash and Ohio from those draining the southern part of the state into the Mississippi. There are 275 rivers in the state. The most important streams are the Rock, Illinois and Kaskaskia flowing into the Mississippi, the Kankakee, forming a part of the Illinois, and the Little Wabash and Saline, draining the southeastern part of the state. There are no lakes of importance. The land is well drained although most of it is comparatively level. The surface in the northern part of the state is rolling prairie, in the central part it is mostly level except along streams where there are occasional bluffs and in some localities where the streams have worn low channels which break the monotony of the level country. A spur of the Ozark Mountains extends across the southern part of the state, and this region is beautifully diversified with green hills and fertile valleys. Here are forests of hardwood which are valuable sources of lumber.

CLIMATE. The climate of Illinois is characterized by warm summers and mild winters. In the northern half of the state the mean annual temperature is 47° and in the southern part 58°. The temperature is subject to sudden and violent changes

because there are no mountain barriers to obstruct winds from the north or the south and a change of current usually brings a decided change in temperature. The average rain fall is 38″. Throughout the state the climate is healthful.

Geographic Advantages. Illinois is remarkably fortunate in its location. Bordered on the west by the Mississippi, on the south by the Ohio and Wabash, the southern and western parts of the state have the advantage of water transportation throughout the year. On the northwest is Lake Michigan, the beginning of the waterway to the East. The Illinois River is navigable for light boats as far as La Salle. The comparatively level surface has made the construction of railways easy and comparatively inexpensive. Because of these conditions, Illinois has never been isolated from other parts of the country and the ease with which it could be reached led to its rapid development. The soil, unsurpassed in fertility, attracted sturdy farmers from the eastern states and to these early settlers very much of the rapid agricultural and political development of the state is due.

Mining. The coal beds of Illinois are estimated to have an area of 42,900 square miles, the largest of any state in the Union. There are coal mines in over one-half of the counties but the output from the southern part of the state is larger than from other localities because the veins there are thicker and much easier to work. The average annual output of soft coal exceeds 60,000,000 long tons, giving Illinois third place as a coal producing state, it being outranked by Pennsylvania and West Virginia. Petroleum is the second mineral in importance. The oil fields lie in Crawford, Clark and Edgar counties. Clay suitable for making brick and tile is widely distributed, and the clay production is of great value. Lead and zinc are found in the northwestern part of the state and considerable lead ore is mined in Jo Davis County.

Agriculture. Illinois is one of the richest agricultural regions of the world. The soil is remarkably fertile and the climate ideal for agricultural purposes. No state exceeds it in value of farm property. Lying in the heart of the great corn belt, Illinois is one of the greatest corn growing regions in the world. Between this state and Iowa there is constant rivalry for first place in corn production. The corn crop averages about 310,000,000 bushels annually. In 1917, under the stimulus of high prices caused by the war, 418,000,000 bushels were produced. Other important cereal crops are oats, wheat, barley and rye; hay, potatoes, broom corn; and sorghum are also produced in large quantities. In the southern part of the state apples, pears, peaches and small fruits are grown in abundance. Raising live stock is an important branch of the agricultural industry, and in the corn belt thousands of swine are prepared for market each year. In the regions around Chicago are numerous large dairy farms which derive their revenue by supplying milk to the city.

Soil and surface in Illinois are especially adapted to the use of agricultural machinery, and while the crops increase in size and value we find the number of farm laborers constantly on the decrease. This is because the use of machinery has become general, and with it one workman can accomplish much more than a number of workmen can by the use of hand tools.

Manufactures. Illinois is the third state in the Union in the extent and value of its manufactures. The census of 1920 gives the following data of manufacturing industries for the state:

Establishments	18 594
Persons engaged	805,000
Primary horse power	1,660 766
Capital invested	$3,367,955,000
Value of production	$5,425,244,694

Chicago is the great manufacturing center. Of the establishments enumerated above 10,538 were located in that city. These establishments give employment to 502,300 persons, and the value of their output was $3.658,740,000. The above figures do not include hand trades, building trades nor neighborhood industries. The leading industries according to the value of their production are slaughtering and meat packing, foundry and machine shops, printing and publishing, mens' clothing, agricultural implements, iron and steel, includ-

ing rolling mills, and manufacturing and repairing railway cars. The annual output of each of these industries exceeds $50,000,000, and that of the meat industry is approximately $400,000,000.

TRANSPORTATION. Illinois is the second state in extent of railway mileage being exceeded only by Texas. There are within the state 12,125 miles of main lines which cross the state in every direction. Chicago is the greatest railway center in the world and is the meeting place of thirty-four trunk lines whose combined mileage exceeds 60,000 miles. East St. Louis and Peoria are also important railway centers. There are over 3,700 miles of electric lines within the state, and the Illinois Traction System, extending from Danville to East St. Louis, has lines radiating to all important cities in the central part of the state. Electric lines, centering in Chicago, extend to Milwaukee, Elgin, Aurora and Joliet, and from Joliet to Kankakee and numerous towns in Indiana.

The Ohio and Mississippi rivers are navigable throughout the year, and light boats ascend the Illinois as far as La Salle. The Hennepin Canal, also known as the Illinois and Mississippi Canal, connects the Illinois River at Hennepin with the Mississippi and Rock rivers. Lake Michigan provides a waterway to the East. Progress is now being made on the extension of the Chicago Drainage Canal (which see) to the Illinois River and the deepening of the channel in that river so that a deep waterway will soon extend from Lake Michigan to the Gulf of Mexico. The old Illinois and Michigan canal is out of service.

POPULATION. In 1920 the population was 6,485,280. Of this number 3,066,563 were native whites, 2,025,819 were of foreign or of mixed parentage, and 1,206,951 were foreign born. 4,403,153 or 67.9 per cent of the population was urban. The increase during the decade was 15 per cent. There were within the state 182,274 Negroes, 2,776 Chinese and 104 Indians. Over 3,530,000 inhabitants lived in Cook County. There are 17 cities with over 25,000 inhabitants.

EDUCATION. The public schools are organized on the district plan. Consolidated schools are rapidly increasing in number. The entire system is in charge of a state superintendent of public instruction. High schools are found in all cities and larger towns. Township high schools are located in smaller towns and cities and in the open country, so that there is opportunity for every youth to receive a high school education and live at home. The city school systems are being reorganized on the plan of the elementary school, the junior high school and the senior high school. Teacher colleges are maintained at Normal, Carbondale, Charlestown, De Kalb, Macomb and Chicago, the last being a part of the Chicago educational system.

The University of Illinois is one of the largest and most important state universities in the Union. The main university, located at Champaign, Urbana, maintains colleges of liberal arts, sciences, agriculture, engineering, law and commerce and schools of music, education and library schools. The colleges of medicine and dentistry and school of pharmacy are located in Chicago. A special summer session is held for the purpose of assisting teachers. In 1922 the faculty numbered 987 and the enrollment was approximately 11,000.

Other important universities within the state are the University of Chicago, Northwestern University at Evanston, Loyola University in Chicago and Millikin University at Decatur. There are also many colleges and secondary schools maintained by religious denominations. Schools for the deaf and dumb and for the blind are at Jacksonville. An institution for feeble-minded is at Lincoln. Special provision is made for classes for deaf pupils in the public schools.

Penal and charitable institutions and hospitals for the insane are maintained at Chicago, Jacksonville, Alton, Bartonville, Anna, Kankakee, Elgin, Peoria, Chester and Watertown. The state penitentiaries are at Chester and Joliet and the state reformatory for juveniles is at Pontiac. The State Training School for Girls is at Geneva and the State Training School for Boys is at St. Charles. There is a hospital

for epileptics and a colony for feeble-minded at Dixon. There is a soldiers' home at Quincy and a soldiers' orphans' home at Bloomington; also a United States soldiers' orphans' home at Danville. The penal and charitable insitutions are under the care of a charitable commission of five members and there are auxiliary boards with similar powers in each county. The most advanced methods are employed in these institutions and every possible means to effect a cure of the patient is used and many valuable results have been obtained.

GOVERNMENT. The present constitution was adopted in 1870. A new constitution presented to the voters in 1922, after three years of work by a constitutional convention, was rejected by a large majority. The legislature comprises a senate of 51 members and a house of representatives of 153 members. Senators are elected for four years and representatives for two years; one-half of the senate is chosen every two years. The legislative sessions are biennial and are unlimited.

The executive department comprises the governor, lieutenant-governor, secretary of state, auditor of public accounts, treasurer, superintendent of public instruction and attorney-general, all elected by popular vote for four years, except the state treasurer, whose term is two years. He cannot succeed himself. The judicial system comprises a supreme court consisting of one judge of each judicial district into which the state is divided, and circuit courts, an appellate court and county courts, with justice courts at the bottom of the list. Chicago has its own special municipal courts.

HISTORY. So far as is known, Joliet and Marquette were the first white men to enter the territory comprising the present state of Illinois. In 1673 these explorers, who had rediscovered the Mississippi River, entered the Illinois River on their return and discovered the Kaskaskia Indians, near Starved Rock in La Salle County. In 1619 La Salle explored the same region and built a fort near the present site of Peoria. Fort St. Louis was erected on Starved Rock in 1682. Kaskaskia, founded in 1700, was the first permanent settlement. The state was named from the Illinois Indians, who were friendly, and the first settlements were made by the French.

The Treaty of Paris, in 1763, placed the territory under the control of the English, and this change led to serious opposition on the part of the Indians, which extended through the Revolutionary War. George Rogers Clark in 1779 entered the territory from the south and in a number of engagements drove the Indians from the strongholds in the southern part of Illinois and Indiana. In 1787 the state became a part of the Northwest Territory, and in 1809 it was organized as an independent territory. It was admitted as a state on December 3, 1818, having at that time a population of about 50,000. Indian tribes still continued to disturb the settlers in the northwest until they were quieted by the Black Hawk War in 1832. Since that time the history of the state has been one of unbroken progress and prosperity.

In the period preceding the Civil War the state attracted wide attention because of the debates between Abraham Lincoln and Stephan A. Douglas over the question of slavery. During that war the state supplied 206,000 men for the Union armies. In 1893 the World's Columbian Exposition was held in Chicago. In the year following the state was disturbed by a railway strike which broke out at Pullman and affected all the railroads in the state. During the World War, Illinois supplied 188,000 drafted men and over 163,000 volunteers, or a total of 351,153 to the armed force of the nation. Cantonments were established at Rockford, Great Lakes, Lake Bluff and Fort Sheridan, which centers were used as recruiting and training stations; there were aviation fields at Rantoul and Belleville, as well as some smaller training stations in other locations. A great army of volunteer workers affiliated themselves with the war work and contributed materially toward the success of the American troops.

Illinois has been the home of Lincoln, Grant, Douglas, Logan and a large number of other men who have attained national and even world wide prominence.

STATISTICS. The following statistics are the latest to be had from trustworthy

sources:	
Land area, square miles	56,043
Water area, square miles	622
Forest area, acres	5,100,000
Population (1920)	6,485,280
White	6,299,223
Negro	182,274
Foreign born	1,206,951
Chief Cities:	
Chicago	2,701,705
Peoria	76,121
East St. Louis	66,767
Rockford	65,651
Springfield	59,183
Decatur	43,818
Joliet	38,442
Aurora	36,397
Quincy	35,978
Danville	33,776
Bloomington	28,725
Elgin	27,454
Number of counties	102
Members of state senate	51
Members of house of representatives	153
Salary of governor	$12,000
Representatives in Congress	27
Assessed valuation of property	$4,234,951,430
Bonded indebtedness	17,500
Farm area, acres	31,997,513
Improved land, acres	27,294,517
Corn, bushels	305,966,000
Wheat, bushels	45,234,000
Oats, bushels	121,741,000
Potatoes, bushels	6,413,000
Hay, tons	3,743,000
Broom corn, tons	4,400
Tobacco, pounds	525,000
Wool clip, pounds	3,923,000
Domestic Animals:	
Horses	1,324,000
Mules	146,000
Milk cows	1,028,000
Other cattle	1,244,000
Sheep	889,000
Swine	4,585,000
Manufacturing establishments	18 594
Capital invested	$3,367,955,000
Raw material used	$3,488,270,446
Operatives	805,000
Output of manufactures	$5,425.244,694
Output of clothing	$89,144,448
Output of steel and iron	$64,995.121
Meat products	$489,230,324
Coal mined, long tons	80,401.786
Petroleum, barrels (42 gals.)	10,772,000
Miles of railway	12,125
Teachers in public schools	36,559
Pupils enrolled	1,127,560

Illinois River, the most important tributary of the upper Mississippi, flowing in a generally southwesterly direction, and traversing the state of Illinois. It is formed by the union of the Des Plaines and Kankakee rivers, in Grundy County, Illinois, and joins the Mississippi about 24 miles above the mouth of the Missouri. Its length is 500 miles and its drainage area 29,013 square miles, of which 24,726 square miles are in Illinois, the remainder being in Indiana and Wisconsin. It is navigable for 250 miles to La Salle, from which point it is connected by ship canal with the Chicago river; it is also connected with the Chicago Drainage Canal by way of the Des Plaines River. Through the Drainage Canal, the Illinois River has a mimimum velocity of 10,000 cubic feet per second. The Illinois river is to form a link in the "Lakes to Gulf" waterway project.

Illiteracy, inability to read and write. The term is applied usually to grown up people. The percentage of illiteracy in six countries other than the United States is given in the following table. The table is brief, for the reason that post bellum conditions prevent the compilation of accurate statistics in most countries of the world.

PERCENTAGE OF ILLITERACY FOR VARIOUS COUNTRIES.

Country	Age Group—Years	Per Cent Illiterate
Russia	Not stated	73.0
Belgium	Over 10	12.7
Hungary	Over 6	33.3
Uruguay	Over 5	39.8
Greece	Over 10	57.2
Rumania	Over 7	60.6

The countries that in recent years have had the lowest percentage of illiteracy comparatively to the total population are Norway, Sweden, Switzerland and Germany, while European Russia, Spain and Portugal have had the highest percentage.

The low rate in Germany and Switzerland is due to laws requiring attendance at school until the rudiments of an education have been acquired. The high rate in the United States (1900) may be understood by the following analysis. Illiteracy is seven times as great among the colored people as among the whites, but the native whites with over 1,000,000 adults unable to read and write have no call to throw stones at immigrants or at a race lately held in bondage. The following figures, based

upon the census of 1920, give the number of illiterates by race:

White	3,006,312
Native	1,109,875
Foreign parentage	132,697
Foreign white	1,763,740
Negro Total	1,842,161
Grand Total	4,931,905

The following table from the census of 1920, gives the number of persons of ten years or more who could neither read nor write, together with the percentage for each of the states. There was a decrease of 1.7 per cent in American illiteracy from 1910 to 1920:

Florida	71,811	9.6
Kentucky	155,014	8.4
Tennessee	182,629	10.3
Alabama	278,082	16.1
Mississippi	229,734	17.2
Arkansas	121,837	9.4
Louisiana	299,092	21.0
Oklahoma	56,864	3.8
Texas	295,844	8.3
Montana	9,544	2.3
Idaho	4,924	1.5
Wyoming	3,149	2.1
Colorado	24,208	3.2
New Mexico	41,637	15.6
Arizona	39,131	15.3
Utah	6,264	1.9
Nevada	3,802	5.9
Washington	18,526	1.7
Oregon	9,317	1.5
California	95,592	3.3
Maine	20,240	3.3
New Hampshire	15,788	4.4
Vermont	8,488	3.0
Massachusetts	146,607	4.7
Rhode Island	31,312	6.5
Connecticut	67,265	6.2
New York	425,022	5.1
New Jersey	127,661	5.1
Pennsylvania	312,699	4.6
Ohio	131,006	2.8
Indiana	52,034	2.2
Illinois	173,987	3.4
Michigan	88,046	3.0
Wisconsin	50,397	2.4
Minnesota	34,487	1.8
Iowa	20,680	1.1
Missouri	83,403	3.0
North Dakota	9,937	2.1
South Dakota	8,109	1.7
Nebraska	13,784	1.4
Kansas	22,821	1.6
Delaware	10,508	5.9
Maryland	64,434	5.6
District of Columbia	10,509	2.8
Virginia	195,159	11.2
West Virginia	69,413	6.4
North Carolina	241,603	13.1
South Carolina	220,667	18.1
Georgia	328,838	15.3

Iloilo, the capital of the island of Panay, in the Philippine group, is second only in importance to Manila, 250 miles distant. The climate is much better than that of Manila. Early in 1889 Iloilo was captured by insurgents who drove out the Spaniards and made it the seat of government of the so-called Visayas Federation. After the treaty between the United States and Spain was ratified, General Miller was instructed by General Otis to communicate with the rebel governor and make conditions of surrender, which was done; but the insurgents ignored the conditions and fired on the United States gunboat *Petrel*, upon which the *Petrel* and her consort, the *Baltimore,* bombarded Iloilo. In a few hours the insurgents fired the town and fled, but the American troops soon extinguished the fire and hoisted the Stars and Stripes. Iloilo has a good harbor, but there is not much commerce or shipping, the exception being the products of the large sugar plantations in the vicinity.

Il Penseroso. See MILTON, JOHN.

Image Worship, in public or private, the worship of painted or sculptured representations of sacred persons or things. No evidence is found, either in the New Testament, or the early writings of the Christians, of any worship of statues or pictures. One of the first allusions to this practice was made by Tertullian, who appealed to the image of the Good Shepherd as engraved upon chalices. In the Roman catacombs, the tombs of the Christians frequently are ornamented by carved images of the Dove, Cross, the symbolical Fish, the Ship, Adam and Eve, Moses striking the Rock, Jonah, Daniel in the lion's den, the Apostles and the Good Shepherd. Those compartments which were used as chapels were profusely decorated with sacred representations. From fear of perpetuating idolatry, the use of images during the first three centuries of the Christian era was exceptional and rare. After the establishment of Christianity by Constantine, however, the pictures of the Savior, the Virgin Mary, the Apostles, etc., were introduced in Italy and the East. During the 5th, 6th and 7th centuries such practices as the burning of candles before sacred im-

ages, and kneeling and praying before them, were introduced. Some worshipers went so far as to make godfathers of these images. In the second Council of Nice, distinctions as to the worship of images were carefully made, for instance, as between the supreme worship of adoration and the inferior worship of honor or reverence. There has been much controversy on the subject.

Imagination, a change in consciousness due to attending to experiences not present to the senses, but which have been present at some previous time. Imagination and remembering are alike in that both processes depend upon revival of past experiences, but in remembering there is present a more or less definite recognition of the experience as something which has been present in consciousness before. The simplest type of imagination reproduces past experiences without much re-arrangement or change of details. The train of images passes through the mind, each one serving as a suggestion to call up the one that follows; all are commonplace and differ from the original experience only in being less accurate and less vivid. All normal human minds are capable of this kind of imagining.

But if imagination stopped here, human society would make little change. Art, invention, discovery, progress depend upon constructive imagination. The mind which imagines constructively is limited by past experience only as to the elements used. No one can imagine a totally new color, a sound different from anything ever heard, or an odor not at all like any ever smelled before, but almost every one can recombine elements of past experiences in such manner as to produce results which seem quite new. To possess great facility in constructive imagining one must have, therefore, varied and rich experiences from which to draw the elements needed. Children who live in city slums can have but little constructive power. The variety which comes from a good country environment has long been recognized as conducive to this kind of imagining.

Power to imagine constructively is one of the most important qualifications for leadership. The true leader must be able to free himself from limitations of space and time. The future he pictures must be unlike the past he has experienced. To induce all persons to use elements of old experiences in new ways is one of the great problems of education. Practically everything of value that the race has accomplished has existed first in the mind of those who could imagine constructively.

Imitation, one of the strongest natural tendencies of the human animal. Man is more imitative than any other animal. Animals which do not imitate can receive but little training and almost no education. Man acquires language, manners, morals, politics, religion, largely through imitation of those about him. The development of conscience in the child is thought to be due to imitation, to the desire to be like others and to the tendency to seek their approval. Throughout all human acquisition the tendency to imitate helps to initiate habits. After a habit becomes established the individual may or may not think of the meaning of what he does. The young man is likely to vote as his father voted, the young woman is likely to cook as her mother cooked; both legislation and digestion may suffer the consequences.

The simplest type of imitation is almost reflex in nature. The suggestion which starts the response is something perceived, but the imitator is hardly aware that he has perceived or that he is imitating. When someone in an audience coughs, that serves as suggestion and many others follow the example. They would probably declare that they needed to cough. Peculiar movements, facial expressions, tones of voice, peculiarities of pronunciation, are imitated in this spontaneous way. Hence it is bad for children to be with attendants or teachers who have undesirable modes of expression. A child with no impediment in his speech has become a stutterer from association with another who stuttered because of actual physical difficulties.

Another type of imitation is voluntary. The imitator knows that he is imitating. His memory, imagination and power to think are involved in keeping before his attention the suggestion he is trying to copy. Learning to write involves much of this kind of imitation. A child had difficulty with a long word; his teacher pro-

nounced it slowly, calling attention to the place of her tongue against her teeth. This furnished the suggestion needed; the pupil made an effort and succeeded. That was voluntary imitation because the imitator was conscious of making an effort to be just like the example. Too much voluntary imitation may easily be demanded and this has led to condemnation of all imitation in connection with the education of children. The danger is not in too much voluntary imitation, but in too little opportunity to use constructively the experiences gained in that way. See IMAGINATION.

A third type of imitation is dramatic. A little boy saw men putting up telephone wires; a few days later he was observed tying strings to the posts of the porch and calling to imaginary workmen. He had completely forgotten himself; he was a workman giving orders to men who were real to him. His imitation was highly dramatic. Memory and imagination were employed in keeping the suggestion before him, but he was not conscious of putting forth effort. He had entered into the life of another person. He was not trying to be like that person; for the time being he was that person. That is the difference between voluntary and dramatic imitation. A good actor imitates dramatically, a poor one voluntarily; a good actor plays the part, a poor one works.

Dramatic imitation is valuable because it widens experiences in ways that would otherwise be impossible, and the reflex effect upon real personality is often beneficial. A boy who played the part of the prince in *The Prince and the Pauper* seemed to possess more princely qualities than belonged to him before. But the difficulty in much so-called dramatic imitation lies in the fact that it is not dramatic, but merely voluntary. Unless the performers forget themselves and really play their parts the performance can have but little value.

Most complex of all is imitation of an ideal. Every one is imitating some sort of an ideal whether he is aware of it or not. All of a man's experiences are contributing to the general notions or ideas of what he wants to be. These general notions or ideas have suggestive power. They may come from observation of other persons or from reading, but come they do into every normal consciousness. It is therefore most important for children and youth to be associated with persons who contribute to the establishment of desirable ideals, and to have access to books reflecting the best minds the world has known.

Immigration, the act of moving into a country to live permanently. An emigrant, by way of distinction, is one who leaves a country. When an entire people move into another country it is said to migrate or invade. The early movements of the peoples of Europe were chiefly of this sort. Emigration and immigration, on the other hand, are individual acts. A person, a family, or a company leaves the fatherland and goes to another country to make a home. As a matter of fact, all the inhabitants of the two Americas, save the Indians, are immigrants or descendants of immigrants. The United States has received settlers from every known country of the globe, chiefly, however, from western Europe. The earliest immigrants, known as colonists, were English, Swedes, Dutch, French, and Spanish. Religious persecutions induced many Europeans to settle in the United States. The Huguenots of South Carolina, the Moravians and Quakers of Pennsylvania, and the Puritans of New England were immigrants of this sort.

The population of the colonies at the time of the Revolution was of mixed blood, and it was good blood. One-third of the whole population in 1775 had been born in Europe. The colonies had been the refuge for decades of those who insisted on doing their own thinking, or, at least, of those who thought they were thinking for themselves. The independent Catholics of Protestant countries and the independent Protestants of Catholic countries—people who refused to be coerced—emigrated to America. The adventurers came to our shores. Criminals, too, fled from justice, and of them, it may be said that they were not lacking in ability. From 1766 to 1816, or during the Napoleonic wars in Europe and our war of 1812, there was very little immigration. The year 1840 and the years immediately following gave a new impetus to the movement. This was a period of

European unrest and of revolution and of harsh governmental suppression. Carl Schurz and many another good citizen fled to this country to escape arrest. Others came to avoid military service. The Irish famine in the later forties caused the beginning of an immense Irish immigration.

In the earlier years of the republic, a liberal policy of selling lands and later of granting homesteads to those who would occupy them drew a very desirable class of immigrants, chiefly from northern Europe and the British Isles, who desired to cultivate the soil. This class of immigration reached its greatest height in 1882, when 788,992 aliens reached our shores. The more immigrants of this sort, the better for the country. Of late, however, the opportunity to obtain fertile public lands has diminished. Manufacturing has increased greatly. A less desirable class of people, attracted by the opportunity to earn wages, has flocked to our shores. The tide of immigration is now from southern Europe. About 1890 the change was very noticeable. Between 1820 and 1900 no less than 20,952,467 foreign passengers landed in our ports. A few of these were visitors who returned to their native homes. In 1903 we received 857,046 immigrants. More than three-fourths of them were from Russia, Poland, Austria, Hungary, and Italy.

For decades anyone was allowed to come to this country who cared to do so. In 1882 the custom house authorities were instructed to bar out criminals, the infirm, and paupers. People of this class were to be returned at the expense of shipowners. In 1885 an act was passed forbidding the importation of any person under contract to work. This was designed to prevent railroad companies and manufacturers from contracting in Europe for help with which to supplant higher priced native labor. For all that, our railroad laborers are largely Italians. In 1903 it was deemed necessary to require our foreign consuls and immigration agents to inquire into the case of those who were about to set sail in order that all undesirable persons might be prevented from embarking. The natural desire of European countries to be rid of the pauper element, and the anxiety of shipowners to earn passage money, are two factors that have combined to make European immigration an object of serious concern. See ALIENS.

The increase in the number of undesirable aliens who came to our shores led Congress in 1903 to establish strict regulations. Under the provisions of this act, the immigration officers are instructed to exclude: (1) Idiots; (2) insane persons; (3) epileptics; (4) prostitutes; (5) paupers; (6) persons likely to become public charges; (7) professional beggars; (8) persons afflicted with a loathsome or contagious disease; (9) persons who have been convicted of a felony or other crime or misdemeanor involving moral turpitude, not including those convicted of purely political offences; (10) polygamists; (11) anarchists (or persons who believe in or advocate the overthrow by force or violence of the government of the United States or of all government or forms of laws, or the assassination of public officials); (12) those deported within a year from date of application for admission as being under offers, solicitation, promises or agreements to perform labor or service of some kind therein; (13) any person whose ticket or passage is paid for with the money of another, or who is assisted by others to come, unless it is shown that such person does not belong to one of the excluded classes; but any person in the United States may send for a relative or friend without thereby putting the burden of this proof upon the immigrant.

The care with which our customhouse officers enforce the immigration laws may be inferred from the fact that 7,994 alien immigrants were refused admission to the United States in the year 1904. Of these, 4,798 were paupers, or persons likely to become public charges; 1,560 were persons having loathsome or contagious diseases; 1,501 were contract laborers; thirty-three were insane; sixteen were idiots; thirty-five were convicts; and thirty-eight were paupers who had been assisted to leave their native countries.

At the beginning of the present century 10,341,276 of our total population were of foreign birth. The following table is interesting as showing the sources from which

these people have been drawn, and the mixture of races which is taking place:

Ireland	1,615,459
England	840,513
Canada (English)	784,741
Scotland	233,524
Wales	93,586
Germany	2,663,418
Austria	275,907
Holland	104,931
Sweden	572,014
Norway	336,388
Denmark	153,805
Switzerland	115,593
Canada (French)	395,066
France	104,197
Italy	484,027
Russia	423,726
Poland	383,407
Hungary	145,714
Bohemia	156,891
Mexico	103,393
China	81,534
Other countries	273,442
Total	10,341,276

The following table shows the immigration into the United States by decades:

1821 to 1830	143,439
1831 to 1840	599,125
1841 to 1850	1,713,251
1851 to 1860	2,598,214
1861 to 1870	2,314,824
1871 to 1880	2,812,191
1881 to 1890	5,246,613
1891 to 1900	3,687,564
1911 to 1920	5,705,801
Total 1821 to 1920	33,616,402

Immigration from 1820 to 1905 may be classified as:

Netherlands	146,168
France	428,894
Switzerland	220,199
Denmark, Norway, and Sweden	1,730,722
Italy	2,000,252
Japan	88,908
Germany	5,187,092
United Kingdom, Great Britain and Ireland	7,286,434
Russia	1,452,629
Countries not specified	2,130,756
China	288,398

Admission of immigrants at the larger ports of entry for a recent year were:

New York	788,219
Boston	65,107
Baltimore	62,314
Philadelphia	23,824
Honolulu	11,997
San Francisco	6,377
Other Ports	24,447
Through Canada	44,214

Countries and immigrants from each in ports of entry of the United States ran something like this annually, up to 1914:

Austria-Hungary	168,509
Belgium	4,162
Bulgaria, Servia and Montenegro	10,827
Denmark	4,954
France, including Corsica	8,788
German Empire	32,309
Greece	21,489
Italy, inc. Sicily and Sardinia	128,503
Netherlands	5,946
Norway	12,412
Portugal, inc. Cape Verde and Azore Islands	7,307
Roumania	5,228
Russian Empire and Finland	156,711
Spain, inc. Canary and Balearic Islands	3,899
Sweden	12,809
Switzerland	3,281
Turkey in Europe	11,290
England	47,031
Ireland	30,556
Scotland	13,506
Wales	2,287
Other Europe	97
Total Europe	691,901

From 1914 to 1918 immigration was practically suspended, but it began again in 1918 and has increased each year as shown by the following figures: In 1918. 101,618; 1919, 141,232; 1920, 430,000. The largest number came from the countries of southern Europe.

The Dillingham Immigration Bill, which passed the 67th Congress, restricted immigration for one year, from May 1, 1921, to three per cent of each nationality residing in the United States when the census of 1910 was taken. The success of this law was such that in 1922 it was extended to June 30, 1924.

As for immigrants, we cannot have too many of the right kind, and we should have none of the wrong kind. I will go as far as any in regard to restricting undesirable immigration. I do not think that any immigrant who will lower the standard of life among our people should be admitted. . . . The need is to devise some system by which undesirable immigrants shall be kept out entirely, while desirable immigrants are properly distributed throughout the country.—Roosevelt.

America is God's crucible—the great melting-pot—where all the races of Europe are fusing and reforming. Here you stand, good folk, think

I, when I see them at Ellis Island; here you stand in your fifty groups, with your fifty languages and your histories and your fifty blood feuds and rivalries. But you won't be long like that, brothers, for these are the fires of God you have come to—these are the fires of God! A fig for your feuds and vendettas! Germans and Frenchmen, Irishmen and Englishmen, Jews and Russians—into the crucible with you all! God is making the American!—Israel Zangwill, *The Melting Pot.*

See the living stream pour into America through the raceway of Ellis Island. There is no such sight to be seen elsewhere on the planet. Suppose for the moment that all the immigrants of 1905 came in by that wide open way, as eight tenths of them actually did. If your station had been by that gateway, where you could watch the human tide flowing through, and if the stream had been steady, on every day of the 365 you would have seen more than 2,800 living beings —men, women, and children, of almost every conceivable condition except that of wealth or eminence—pass from the examination "pens" into the liberty of American opportunity. Since the stream was spasmodic, its numbers did reach as high in a single day as 11,343.

Imagine an army of nearly 20,000 a week marching in upon an unprotected country. At the head come the motley and strange-looking migrants—largely refugee Jews—from the far Russian Empire and the regions of Hungary and Roumania. At the daily rate of 2,800 it would take this indescribable assortment more than 166 days to pass in single file. Then the Italians would consume about eighty days more. For over eight months you would have watched so large a proportion of illiteracy, incompetency, and insensibility to American ideals, that you would be tempted to despair of the Republic. Nor would you lose the sense of nightmare when the English and Irish were consuming forty-two days in passing, for the "green" of the Emerald Isle is vivid at Ellis Island, and the best class of the English stay at home. The flaxen-haired and open-faced Scandinavians would lighten the picture, but with the equally sturdy Germans they would get by in only a month and four days.

Gather these immigrants by nationality, and you would have in round numbers twenty-two Italian cities of 10,000 people, or massed together, a purely Italian city as large as Louisville with its 220,000. The various peoples of Austria-Hungary — Bohemians, Magyars, Jews, and Slavs—would fill twenty-seven and one-half towns; or a single city nearly as large as Detroit. The Jews, Poles, and other races fleeing from persecution in Russia, would people eighteen and one-half towns, or a city the size of Providence. For the remainder we should have four German cities of 10,000 people, six of Scandinavians, one of French, one of Greeks, one of Japanese, six and a half of English, five of Irish, and nearly two of Scotch and Welsh. Then we should have six towns of between 4,000 and 5,000 each, peopled respectively by Belgians, Dutch, Portuguese, Roumanians, Swiss, and European Turks; while Asian Turks would fill another town of 6,000. We should have a Servian, Bulgarian, and Montenegrin village of 2,000; a Spanish village of 2,600; a Chinese village of 2,100; and the other Asiatics would fill up a town of 5,000 with as motley an assortment as could be found under the sky.—Howard B. Gross.

Impeachment, the accusation and prosecution for removal from office of a judge or administrative officer whose position places him above the ordinary courts. In Great Britain the House of Commons impeaches; the House of Lords hears the case. The practice arose in the Middle Ages as a means of getting rid of undesirable royal favorites, and has been greatly extended in more modern times. Warren Hastings, it may be remembered, was impeached by the House of Commons in 1787. A committee headed by Edmund Burke presented the case to the Lords. The trial lasted eight years. In the United States the impeachment is presented, that is to say, the charges are drawn up, by the House. A committee of representatives is appointed to conduct the prosecution. The case is heard by the Senate with the chief justice presiding. A two-thirds vote is necessary to convict.

There have been eight cases of impeachment in the history of the United States:

1. William Blount, United States senator from Tennessee, was impeached in 1797 for entering into a conspiracy with British officers to divert part of Louisiana from Spain to England. He was acquitted on a technicality, but was expelled from the Senate.

2. In 1803 John Pickering, a judge of the Federal Court for New Hampshire, was impeached, convicted, and removed from office, on account of drunkenness and profanity on the bench.

3. In 1804 Samuel Chase, a justice of the Supreme Court, was impeached. The proceedings were instituted by John Randolph of Virginia, on the ground of partisanship on the bench. The necessary two-thirds vote was not obtained.

4. In 1830 Judge Peck, of the Federal Court of Missouri, was impeached for arbitrary conduct in punishing an attorney for contempt of court. He was acquitted by a vote of 21 to 24.

5. In 1862 Judge Humphreys, of the

Federal Court of Tennessee, joined the Confederacy without sending in his resignation. In order to clear the way for the appointment of a successor, he was impeached and removed from office.

6. The most stirring impeachment in the history of the United States was that of President Andrew Johnson in 1868. He was charged with violating the constitution, and with making statements tending "to bring the high office of president into contempt, ridicule, and disgrace." Johnson was not convicted.

7. In 1876 Secretary of War Belknap was impeached. He resigned; the senate failed to convict.

8. In 1905 Judge Charles Swayne of the northern district of Florida, was impeached for favoritism and excessive charges.

9. Robert W. Archbold, Associate Judge of the United States commerce court, was impeached in 1912, for forming corrupt alliances with railroad officials and coal-mine owners while in office. He was convicted and removed from office.

10, Alston G. Dayton, of West Virginia, Judge of the United States District Court, was impeached in 1914. Proceedings were dropped without a trial.

The constitutions of the various states make similar provisions for the impeachment of local judges and state officers. In the case of minor officers the president or governor has authority to remove from office for cause.

Impeachment is the heaviest piece of artillery in the congressional arsenal, but because it is so heavy it is unfit for ordinary use. It is like a hundred-ton gun which needs complex machinery to bring it into position, an enormous charge of powder to fire it and a large mark to aim at. It is an extreme remedy, proper to be applied against an official guilty of political crimes, but ill-adapted for the punishment of small transgressions.—Bryce.

Imperalism, in its widest sense, is the exercise of unlimited rule over a vast extent of territory—such a sway as that at which Charlemagne aimed. Latterly, however, and especially in the United States, the term is used with reference to the policy of national expansion, and has been the cause of much controversy and conflict. Each acquisition of territory outside the continental limits of the United States has resulted in bitter critcism from the so-called anti-imperialists. In 1901, however, the Supreme Court of the United States declared that a limited imperialism, purposing to improve and generally advance the annexed population, is within the scope of and entirely consistent with national government. Great Britain leads the nations in imperialism, while France and some others are imperialistic to a lesser degree.

Imports. See COMMERCE.

Incas, an Indian people of South America resembling in many respects the Aztecs of Mexico. They inhabited the Sierra region of Bolivia and Peru, between the Cordilleras and the main range of the Andes. Their chief town was Cuzco. Not satisfied with the fertile plain, they terraced the slopes of the mountains and brought them under cultivation. They were governed by a succession of warlike chieftains. There were military trails, or possibly roads, which passed through mountain defiles, crossed the ranges and traversed bleak deserts. Pack trains of llamas were employed to bring home spoils. Tribute was levied on the tribes residing along the Pacific coast. The Inca builders possessed no little architectural skill. Immense stones were quarried and fitted together to build temples and palaces, displaying an ingenuity rivaling that of the Central American builders. The native artisans were workers in metals and produced pottery of a high order. The priests developed an elaborate system of sun worship. They required subject tribes to furnish "sun maidens" for sacrifice. The war power as well as the wealth of the Incas, had reached its height when the country was invaded by Pizarro. The descendants of the Incas still represent over fifty per cent of the inhabitants of Peru. They are described as a slender, well knit people, capable of enduring fatigue. They have a fresh, olive complexion, with a smooth, soft skin. The hair is straight and black, the chin beardless, the nose aquiline. In their homes they are gentle and affectionate. They are industrious cultivators of the soil and make good shepherds, being gentle and patient with the animals. See PIZARRO; PERU; AZTECS; ALPACA;

Incandescent Lamp, an electric lamp consisting of a glass bulb in which the current is made to pass through a wire, filament, or strip of some substance which, because of its high resistance, becomes greatly heated, and hence brilliantly incandescent. In the early days of incandescent electric light, the only suitable substance known was carbon. This was carefully prepared in the form of a thin strip or wire, from bamboo or some similar material, bent in a loop and inclosed in a bulb from which the air had been exhausted, so as to create a vacuum. The current used for incandescent lamps of ordinary power was much weaker than that needed for the arc-light, and this type of lamp came into general use for interior lighting, except in the case of large halls, etc., and in improved forms has also invaded the domain of street lighting, in many places.

Late in the nineteenth century, a German scientist, Professor Nernst of Gottingen, found that a filament made of certain rare earths, including thoria and zirconia, was a non-conductor of electricity at ordinary temperatures, but a very good conductor when even slightly heated. He then devised the Nernst electric lamp, which was an improvement compared with the ordinary carbon incandescent lamp, but was too complicated and delicate an apparatus for general use. Other substances were then made the subject of experiments, for use as filaments in incandescent lamps, including osmium, a rare element which has been termed "probably the most refractory and unalterable solid known to science"; it was used to some extent and furnished a most durable filament. Tantalum, a constituent of the mineral columbite, found in South Dakota and Australia, was also used for electric lamp filament, and is an element as hard as steel and impervious to rust. But the most successful incandescent lamps of recent years have been those furnished with filaments of the metal tungsten; and these are now (1923) in common use throughout the United States. They have an illuminating power much greater than that of the carbon-filament lamp and are much more durable.

Inclined Plane, one of the simple mechanical powers whose name is self-explanatory. A plank with one end on the ground and the other resting on a wagon, upon which a barrel of salt is being rolled, illustrates an inclined plane and its use. The force necessary to support it on the incline bears the same relation to the weight as the height of the incline does to its length. In other words, the law of equilibrium is: The power multiplied by the length of the inclined plane, equals the weight multiplied by the height. A wagon-road winding around and up a hill, a "switch-back" on a railroad or the inclined plane railway as on Mt. Washington, illustrate the principle. The screw and wedge are modified inclined planes. See SCREW.

Income Tax, a direct tax levied by a government upon the income of individuals. As a rule it is collected annually. As a matter of public policy small incomes are exempted. This on the score that the poor have little enough without paying an income tax. The same line of argument that leads to letting off a person of small income altogether prompts the so-called progressive or graduated tax, the rate of which increases as the income increases. As a matter of history it may be stated that an income tax in force in France prior to the French Revolution followed a scale according to which the rate increased as the income diminished. The peasant was required to give up a larger share of his pittance than was taken from the income of the wealthy.

An income tax is common in Europe. England led the way. In 1798 Pitt proposed that all persons having an income in excess of $300 a year pay an income tax to carry on the Napoleonic Wars. The rate was progressive. The schedule started with a tax of $2.50 on an income of $300, and rose to ten per cent of large incomes. This tax was abolished in 1802, but another was levied in its stead. Save for the years when the British government was supported by a corn tax, that is to say, by a tariff on food stuffs for revenue, an income tax has been one of the chief sources of revenue. The present income tax was enacted substantially in 1880. Incomes are divided into five schedules:

a. Income from land and houses.
b. Income of farmers.
c. Income from interest and dividends.
d. Income from commercial, industrial and professional men and corporations.
e. Income from salaries and pensions.

Under the British plan the owner of property is taxed, not on his actual income, but on the income he ought to obtain by right management. It is difficult to point out an essential difference between the taxes on property in schedule and a straight American real estate tax. The details of exemption and graduation are interesting, but would not be in place here. The rates vary from year to year. The proposed rate is a prominent feature of the annual budget submitted by the government to Parliament. The lowest rate for 1909 was 3.75 per cent, and the income tax for the United Kingdom, $165,000,000.

As stated, an income tax prevails throughout Europe. Prussia, beginning in 1811, levied a progressive tax of .6 to 4 per cent on incomes in excess of $225. Austria adopted this form of tax in 1812, and now fixes the upper limit at five per cent. Italy, 1906, taxed all incomes above $40 at a uniform rate of 12 per cent. In 1907 France imposed a heavy income tax. The amount exempted is greater per person in the cities than in the villages. The rate is progressive and varies from 3 per cent on labor to 10 per cent on incomes of $100,000 or over. The progressive income tax of Japan rises by leaps to 68 per cent on the few incomes above $50,000.

An income tax has never been popular in the United States. Americans object to making their private affairs known. It is advocated as a means of taxing the rich and letting the poor go free. Advocates of public ownership suggest a heavy progressive confiscatory income tax as a means of driving private persons and corporations out of business. An income tax was proposed in 1812 as a war measure, but did not carry. In 1861 Congress levied a tax of three per cent on all incomes above $800. In 1862 the exemption was reduced to $600 and the tax was placed at 3 per cent on incomes up to $10,000. Larger incomes paid 5 per cent. In 1864 Congress, in straits for money, revised the schedule again. The rates were placed at 5, 7½, and 10 per cent. The incomes were classified at $600-$5,000; $5,000-$10,000; and incomes above $10,000. This tax remained in force until 1872, save that the exemption was raised to $1,000 and later to $2,000. During the Civil War, while the necessities of the government were great, citizens showed no little degree of patriotism. The tax in 1866 yielded nearly $73,000,000. As soon as the crisis was by, a practice of concealment became general; in 1873, the last year of the tax, it yielded but $5,000,000. The Wilson tariff act of 1894 contained an income tax provision which the supreme court in 1895 declared unconstitutional. President Taft advocated an income tax in lieu of an excessive protective tariff, and during the first year of his administration, Congress passed by the necessary two-thirds vote, a proposed amendment to the constitution permitting the levying and collecting of such a tax. By 1913 three-fourths of the states had ratified the amendment and an income tax law as part of a revenue measure was enacted. In 1919 the normal tax on the net income of corporations was two per cent. This same rate applied to industrial incomes of over $1,000 ($2,000 if the head of a family), but was increased by graduated surtaxes on larger incomes, finally reaching fifty per cent on total net incomes in excess of $1,000,000.

Increment, in economy, an increase of value, particularly an increase in the value of real estate. See UNEARNED INCREMENT.

Incubator, a box-like contrivance or oven for the hatching of eggs by artificial heat. The incubator is by no means a modern idea. Over two thousand years ago the Egyptians were familiar with the method of hatching chickens in ovens, heated with straw. Artificial hatching machines are also credited to the Chinese. Incubators came into general use only within the past twenty years. American incubators are now shipped abroad to various European countries and to Australia. Artificial incubation is very simple, yet requires constant care. It is only necessary to keep the eggs in a warm place and to turn them daily. The most successful machines are constructed in such a way that heat is supplied

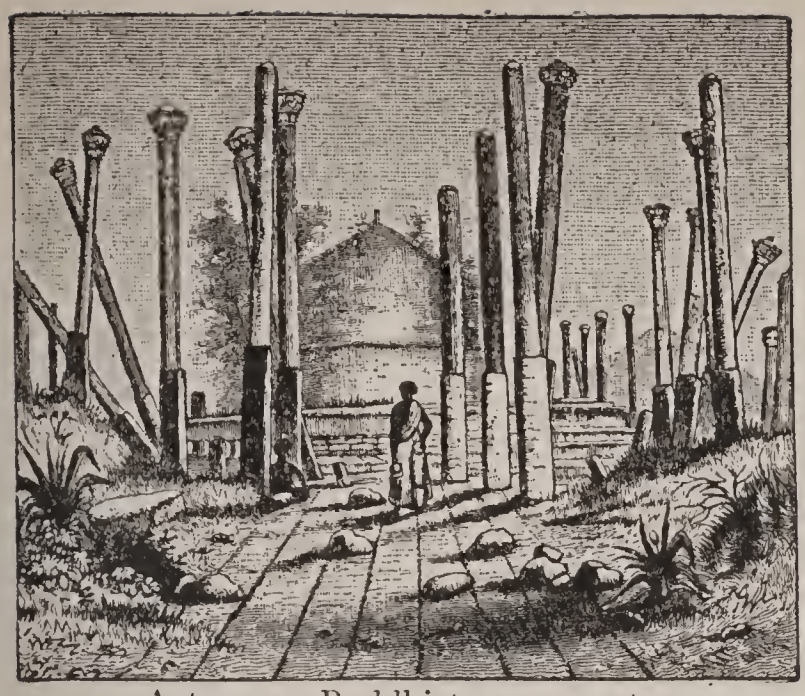
from above rather than from below. They are furnished with a self-acting contrivance devised to keep the air of the chamber at a temperature of about 102° the first half of the hatch and 103° the second half. It is also important that the egg chamber be well ventilated. In imitation of the sitting hen that turns her eggs in the nest each day, the eggs may be turned by hand, or they may be placed in a double tray having a bottom and a top alike. To turn the eggs it is only necessary, therefore, to put on the top, whip the tray over, and remove the half which is now the top. While the proverbial impossibility of counting chickens before they are hatched applies to those in the incubator as well as to those under a hen, a successful poultry raiser expects to hatch at least nine chickens out of every dozen eggs. It is more difficult to take care of the little chicks after they are hatched than it is to bring them forth from the shell. One chicken raiser of Pembroke, New York, employs incubators to do the work of 1,000 hens in which 15,000 eggs are cared for. Heat is furnished by steam and hot water. A thermostat maintains a uniform temperature. See CHICKEN.

Independence Hall, a famous public hall in Philadelphia. It was the capitol building of the colony of Pennsylvania. It is a low, plain, brick structure. It was erected 1729-34. During the Revolutionary War it was occupied by the Continental Congress. The Declaration of Independence was signed here, and was read to the people from the front steps. The old "Liberty Bell" hung in the tower and now occupies a place of honor in the main hall. The building has been converted into a historical museum.

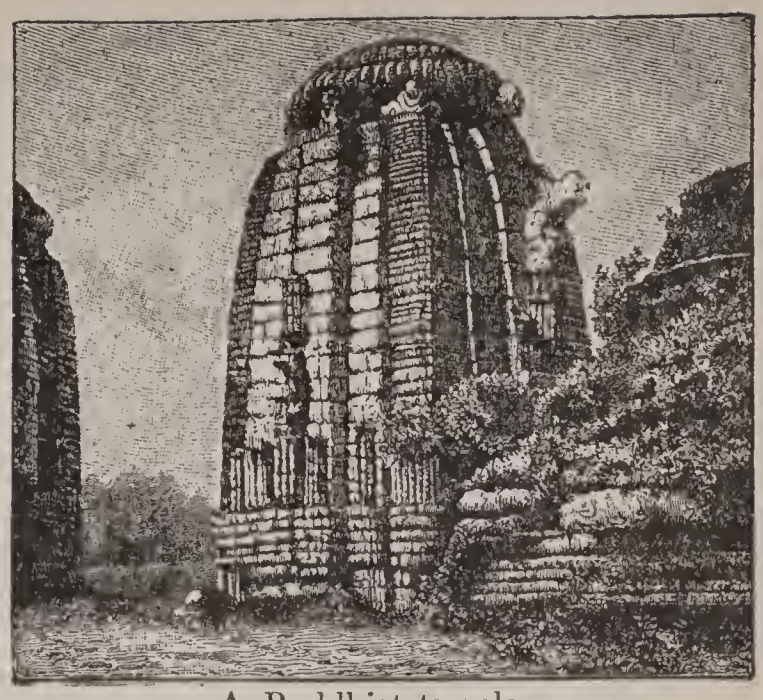
India, a country of southern Asia. Roughly speaking, it consists of the great central peninsula of Hindustan, the provinces on the southern slope of the great mountain system, and a strip of land down the eastern shore of the Bay of Bengal. A peculiar feature of Hindustan proper is a precipitous sea wall from 3,000 to 7,000 feet high, following the eastern and western shores like a capital *V*. It extends inland from forty to seventy miles, sloping gradually into the elevated interior of the peninsula. The two branches are known as the eastern and western ghats or ghauts respectively. The western ghauts are the higher.

The drainage of India is wholly into the Arabian Sea and the Bay of Bengal. Named from the west, the great rivers are three: the Indus, the Ganges, and the Brahmaputra. The area of all India is 1,801,629 square miles. The population in 1921 was reported at 319,075,132, or about 300 per square mile. Next to China, India contains the greatest mass of people under one government on the face of the globe. The number of people is beyond comprehension. With the exception of China, and possibly the Mississippi valley, India is the only region of the globe capable of sustaining so great a population. The valleys of its great rivers have enormous flood plains enriched by annual overflows. Adjoining these are areas of abundant rainfall. In addition, 12,000,000 acres have been brought under cultivation by means of irrigation. A single canal leading out from the Ganges has 440 miles of a main channel and 2,703 miles of tributaries. It supplies water to over 1,000,000 acres. Of the vast population, nearly three-fourths are dependent on agriculture. The people live in hamlets and farm in a small way. Rice, wheat, millet, sugar-cane, tea, cotton, oil seeds, indigo, and tobacco are the principal field crops. There are 70,000,000 acres under rice alone. Jute, coffee, and poppies are also important crops. Garden patches produce household vegetables and melons. Potatoes thrive near the mountains. The orchard fruits are the mango, guava, olive, citron, pomegranate, tamarind, and custard apple. Irrigated and well watered lands produce two crops a year. Over 27,000,000 acres are under double crops.

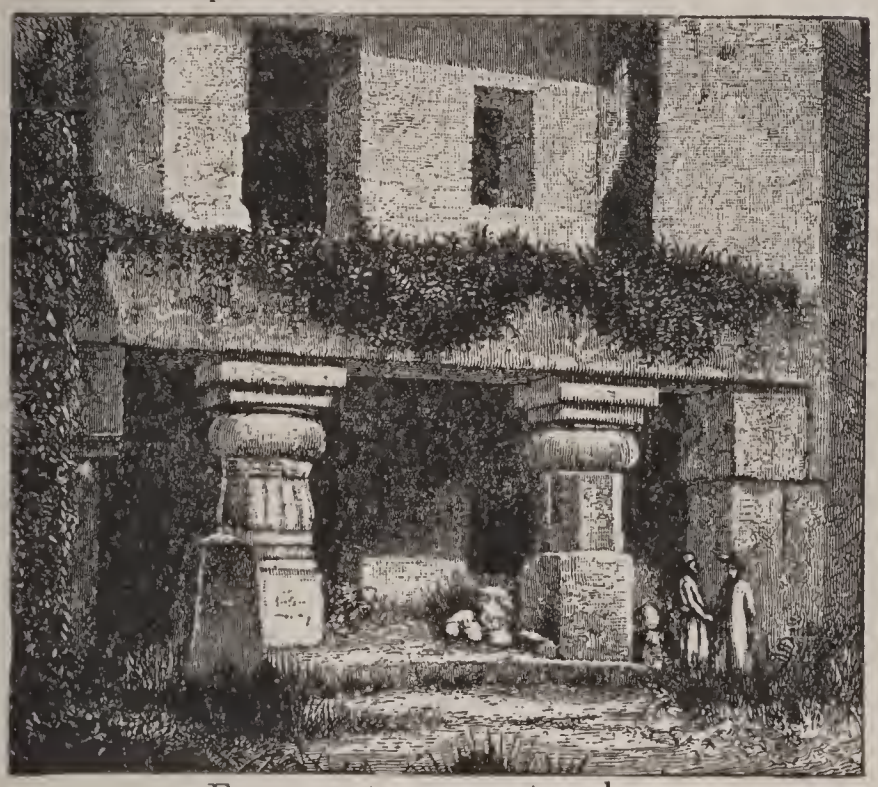
Save well up in the Himalayas the climate is exceedingly hot. After a few years' service Europeans find it necessary to leave in order to recuperate. The amount of rainfall varies greatly. There are districts, especially in the west, little better than the Caspian region. Streams lose themselves in the sand. On the other hand, a certain region on the slope of the Himalayas has the heaviest rainfall known. It amounts at times to 120 inches or 10 feet per year.



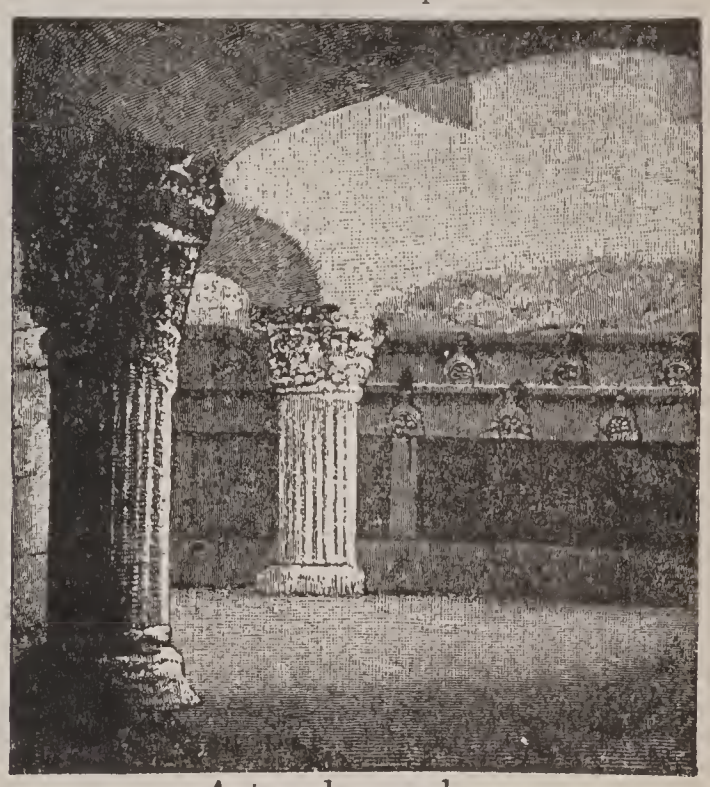
A tope or Buddhist monument.



A Buddhist temple.



Entrance to a cave temple.



A temple arcade.

Rockhewn temple of Badam.

Court rockhewn temple, Ellora.

EAST INDIAN TEMPLES.

Portions of India are densely covered with forests. The most valuable timber tree is the teak, found near Bombay, and along the eastern coast of the Bay of Bengal. The deodar is found in the valleys of the Himalayas. Forests of pines, cedars, and caoutchouc yield large revenues. Of late the government has undertaken to control the forests and to require permits for the cutting of timber. There are extensive tracts of bamboo. The jungles of India are celebrated for wild flowers, especially gorgeous orchids. The largest and fiercest wild animals known hide in these woody growths. The Indian tiger is a much more powerful animal than the lion. The elephant, rhinoceros, leopard, bear, hyena, jackal, wolf, deer, antelope, wild boar, and monkey are yet numerous. The eagle, vulture, falcon, kingfisher, quail, heron, and stork are native birds. Notwithstanding the dense population, considerable portions of the country are uninhabited.

There are more than thirty large cities, two of them having a population of more than a million. Fifty-two others have a population exceeding 50,000 each.

The chief manufactures are cotton, woolen, jute, and paper goods. There are also breweries, sugar refineries, and ice plants. There are 329 coal mines. Many small industries, such as weaving and spinning, are carried on in the homes. There are also soap factories, tanneries, oil mills, factories of pottery and tile, cigar factories, glass works, dye works, and printing establishments.

The commerce of India is of ancient origin. The struggles of the Babylonians, Egyptians, Persians, and Greeks, of which we read in ancient history, were in part, at least, efforts to control the rich caravan trade of India. The discovery of America was but an incident in a methodical attempt to find a water route between western Europe and the valleys of the Indus and the Ganges. The commerce of India is open to the world, but a good half is controlled by British merchants. Accounts are kept in rupees. The rupee is worth about thirty-two cents. R X is the symbol for ten rupees. Rice, wheat, cotton, opium, oil seeds, hides and skins, jute both raw and manufactured, tea, indigo, dyes, coffee, wool, spices, lac, sugar, silk, oils, wood, and saltpetre are exported to Great Britain to the value of $150,000,000 annually. Cloth, hardware, cutlery, machinery, liquors, railway equipment, groceries, salt, glass, chemicals, paper, umbrellas, to nearly twice the amount, are returned nearly all by way of the Suez Canal. The sale of Indian products to foreign countries has risen from $5,000,000 in 1700 to not less than $400,000,000 at the present time.

Nominally, India is an empire. King George of the United Kingdom of Great Britain and Ireland is the emperor. Practically, India is a British possession. It is controlled by a member of the British cabinet, known as the Secretary for India. He is assisted by a council of ten members, who are required by law to have had actual experience in India. The Indian end of the government consists of a governor general resident at Calcutta. He receives a salary of $100,000 a year. Warren Hastings was the first to hold the position. The governor general is assisted by a local council of six secretaries, called the Home, Finance, Military, Public Works, Revenue and Agriculture, and Legislative secretaries respectively. There are sixteen additional members. The department of foreign affairs is managed by the governor-general himself. This council is practically a parliament for India. India is divided into eight provinces, each administered by a governor or other high official. A number of minor districts are in charge of native chiefs, whose acts are controlled by resident British officials. The chief income of the government is derived from the rental of public lands. The government has also a monopoly of the opium business. Lands are rented for the purpose under proper instruction. Opium is bought, manufactured, and purified by the government only. It yields a considerable revenue. The chief expenditures are for salaries, for military supplies, and for a standing army of 230,000 men. One-third of these are European regiments stationed in India for a time.

The history of British influence reminds the reader of the camel that thrust in first its nose, then head, neck, shoulders, and finally took possession of the entire tent. British occupation began in 1639, with the

Hindu woman.

Hindu village in the South Deccan.

Tamil of Ceylon. Rajah. Dancing girl. Brahman.

Sailboat, Bombay.

Zebu cart of a rich Indian.

EAST INDIAN CIVILIZATION.

opening of a trading station at Madras. The establishment of other stations, as Bombay, followed. Sides were taken in the quarrels between native princes. British soldiers made and unmade rulers. Nabobs and moguls were taken under protection; then their territory was taken under protection, until finally, after enormous expenditures of men and money, balanced, of course, by the profits of trade and the receipts of the treasury, India became British. Some writers are inclined to class the conquest of India with highway robbery. The rivals of England for the possession of these rich, vast, defenseless provinces were Portugal, Holland, and France. It was simply a choice of evils or blessings, as the case may be.

British rule has done much for India. Irrigation and the public hoarding of food supplies have rendered famines on a large scale, at least. less likely to occur. Local wars between the various provinces have ceased. The thugs and other classes of criminals have been exterminated. Life and property have been made reasonably secure. Sutteeism, or the burning of widows with the bodies of their deceased husbands, as well as the practice of throwing infants into the sacred river, have been suppressed rigorously.

Thirty-six thousands miles of railroads have been built. Many times that mileage of public highways have been graded and covered with crushed stone or, in the low alluvial lands, paved with burned brick. The cities have been required to adopt sanitary methods of sewerage, and to clear up the filthy, pestilence-breathing suburbs with which they were surrounded. India is by no means a healthful country, but the death rate has been lowered by British rule.

The enormous population is still illiterate. Two hundred and forty-six million people are reported as unable to read and write, yet 197,000 schools have been established. Four million children are now in attendance. The government also maintains a normal school in each province. There are eight universities with about 35,000 students. There are also medical colleges and universities. Of late the Indian government has given much attention to plans for the improvement of agriculture. Experiment farms and agricultural schools have been established. Attention has been directed to methods of rotating crops, enriching the soil, and to the introduction of improved implements and of machinery. Better breeds of cattle, horses, and ponies have been introduced.

There are now about 70,000 post offices and mail stations, as against 753 in 1856. In the year mentioned the postoffice department handled 1,225,000,000 pieces of mail. There are dozens of newspapers in various languages and dialects, and thousands of printing presses at work. The growth of business is but indicative of the advance that has taken place in some other departments.

The problems of India are by no means solved. Millions of people are in ignorance and poverty. Entire villages do not possess as much property, let alone food and clothing, as is owned by the family of a single prosperous western farmer. There is a vast territory to be governed, and the wants of a diversified population to be provided for. The people of India are not of one blood and nationality. In fact, India is a museum of races. There are no less than twenty-five more or less distinct groups of languages. The great river plains are occupied in the main by a people of the white race. They are related, and not very distantly, to the nations of Europe. The mountain districts of the Himalayas and the great table land of southern Hindustan are occupied chiefly by tribes driven from their former homes in the fertile valleys. Primitive people from the plains are still hidden away in the recesses of the mountains. There are tribes in the jungles that live on mice and other small animals, wild fruits, etc. They have neither homes nor fire, but flee like monkeys on the approach of men. It is estimated that there are several million people in India whose methods of living are on a level with those of the lowest negro tribes in darkest Africa.

The situation with relation to religious matters is equally complicated. There are a dozen different religious beliefs. There are about 217,500,000 adherents of Hinduism in its various forms; 66,000,000 are Mohammedans. There are over 10,000,000 Buddhists, about 4,000,000 Christians, sev-

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GLIMPSES OF INDIA

Bullock driver, Agra

Shawl weavers, Kashmir

eral million people whose religious belief it is difficult to classify, as well as a million or two each of Sikhs and Jains. There are about 21,000 Jews engaged in commerce or money lending. Of the Christians about half are Roman Catholics. The Church of England has half a million adherents. Baptists, Lutherans, Presbyterians, and others follow in the order named. In addition to diversity of race and religion, there is the problem of caste. Successive invasions of the country have resulted in the depression of the earlier inhabitants into an inferior social position. Until of late it was worse than leprosy to eat the food, or even to touch the clothing of one of inferior caste. On the other hand, there is much in Indian literature and art of interest. The wealthy had magnificent palaces. The lace, the gems, the precious work, the monuments and decorations of India, are famous in the history of art. The Buddhist pagodas and the cave temples of India, the latter being vast rock-hewn places of worship, cut in the living rock, are the marvel of modern writers. They are guarded with great jealousy by the priests.

Recent History. Since the opening of the present century, unrest has constantly and seriously agitated the Indian population. Though vague at times and as it affected certain elements of the population, though quite definite at other times but taking bizarre form, at still other times, especially during the second decade of the century, this unrest found vigorous spokesmen and definite formulae. The discontent increased until in 1923 it was greater than ever before in the history of Britain's rule of this vast country. For the most part, the great desire of the people is for self government. So violent did the agitation become that in 1921 the Reform Act was passed, by which India is divided into eight districts corresponding, politically, to the provinces of Canada, and each enjoying local autonomy and having its own parliament.

The man who has led the agitation against British rule for several years, M. K. Gandhi, was not satisfied with the Reform Act, however, and continued his work of agitation among the low caste Hindus. He succeeded in instituting a boycott, partial, at least, against everything British, and preached passive but consistent resistance to British authority. As a result of his agitation, Gandhi was arrested by the British authorities, tried, and given a prison sentence of six years. The Indian population generally has been influenced by the Bolsheviki since the Russian Revolution, and by the Turks since the Kemalist coup in 1922.

Statistics. The following statistics are the latest to be had from trustworthy sources:

Area, square miles	1,802,629
Forest area, square miles	250,949
Irrigated area, acres	48,963,033
Population (1921)	319,075,132
Chief Cities:	
Calcutta	1,263,292
Bombay	1,172,953
Madras	522,951
Hyderabad	404,225
Rangoon	339,527
Delhi	303,148
Lahore	279,558
Ahmedabad	274,202
Bangalore	238,111
Karachi	215,781
Cawnpore	213,044
Number of states	44
Members of council	60
Members of legislature	140
National revenue	$ 443,000,000
Bonded indebtedness	$2,320,000,000
Farm land, acres	625,149,442
Cultivated area, acres	222,825,487
Rice, pounds	62,792,920
Wheat, bushels	250,469,000
Flax seed, bushels	16,760,000
Cotton, bales (500 lbs)	3,013,000
Jute, bales	5,915,000
Beans, bushels	71,701,000
Raw silk, pounds	110,000
Tea, pounds	315,340,000
Sugar cane, short tons	2,760,800
Sesamum, bales	368,000
Groundnut, tons	931,000
Domestic Animals:	
Horses	1,699,000
Mules	75,000
Donkeys	1,372,000
Camels	408,000
Oxen	117,428,000
Buffaloes	28,493,000
Sheep	21,984,000
Goats	24,134,000
Manufacturing establishments	4,827
Operatives	1,238,410
Coal mined, tons	22,628,037
Manganese ore, tons	537,995
Copper, tons	32,759

Rubies and sapphires, carats	158,577
Gold, ounces	507,261
Wolfram, tons	3,577
Imports	$179,420,000,000
Exports	$141,070,000,000
Miles of railway	36,735
Postoffices	70,000
Total schools	202,981
Pupils enrolled	8,206,225

India Ink. See INK.

India Linen, a variety of fine cotton lawn, bleached pure white, and finished with considerable starch. It is used for women's and children's gowns. It is sometimes dyed black or in plain colors. The same fabric is also called India linon.

India Rubber. See RUBBER.

Indian Education, the education of the Indians by the United States government. At an early date the colonists in America began to make efforts to teach Indian boys. John Eliot, the "Indian Apostle," and Father Hennepin, the French missionary are two of the many who attempted to instruct the Indians in the Christian religion, and incidentally to give them the rudiments of an education. Before the close of the seventeenth century Indian young men were maintained at the college of William and Mary. In 1775, the Continental Congress voted $500 to be spent in the education of Indian youths. The first appropriation made by Congress for this purpose was in 1819, and the sum was $10,000. The president was authorized at this time, to employ suitable teachers to instruct the Indians in agriculture, and to teach reading, writing, and arithmetic to Indian children. Since that time annual appropriations of large sums have been made, until in 1910 Congress appropriated for Indian Schools the sum of $3,757,909.

By 1873 the Indians were confined in the main to reservations, and the work of establishing schools had progressed to considerable extent. Even after this time, however, church schools had far better success than government schools. The work of the Roman Catholic church in its various missions was especially successful. Day schools proved less efficacious than boarding schools. The influence of the former was counteracted during the hours the children spent in the company of the older Indians, who resented innovations in their mode of life.

In the boarding schools the children were constantly under civilizing influences. Often great difficulty was experienced in getting Indian parents to send their children to school. In 1891 the compulsory education act authorized the Commission of Indian Affairs to enforce attendance of Indian children at schools established for their benefit.

In 1920 about 72 per cent of Indian children of school age were enrolled in schools. About 30,000 of these children were in government schools and an equal number in non-government schools. Among the most important government schools are Haskell Institute, Kansas and the industrial schools at Chilcco, Oklahoma and Santa Fe, New Mexico. The school at Chilcco has a large farm which gives it special advantages for training its pupils in agriculture. Indian pupils are being sent to the public schools wherever practicable, and state authorities are co-operating with the Federal government to the fullest possible extent to educate Indian children with white children, believing that the public school will prove the strongest agency in training the Indians in the ways of civilization.

The government schools place special emphasis on industrial education, especially in agriculture, the occupation upon which by far the larger part of the Indians must depend for a living.

Notwithstanding the efforts of both national and state authorities, a large number of Indian children are still without school privileges. Indian schools are especially needed in Arizona and New Mexico.

CANADA. The government has extended to the Indian all the educational advantages it was possible to extend, and in 1921 there were about 60,000 Indian children of school age, three-fourths of the total, attending school, about half of them attending government schools. The chief reliance of the Indian for a livelihood is agriculture, and the government is doing all possible to aid the original American in this direction. But often after he has

acquired land the gullible Indian is robbed of his possession by scheming white men.

Indian Literature. See LITERATURE.

Indian Ocean, that part of the ocean lying between Africa, Asia, the Malayan Archipelago and Australia. Modern geographers limit it on the south by the 40th parallel of S. latitude, in which region it opens into the Southern and Antarctic oceans. To the north it is divided by the Indian peninsula into the Bay of Bengal on the east and the Arabian Sea on the west, the latter sending out two arms, the Persian Gulf and the Red Sea. The area is about 17,320,500,000 square miles.

The mean depth of the Indian Ocean is estimated at about 2,300 fathoms, or a little deeper than the Atlantic Ocean. Its greatest depths are in the viciniy of the equator, where there is a stretch of fully 50,000 square miles having a depth of over 3,000 fathoms.

In the beginning of history the Indian Ocean was called the Erythraean Sea. The Phoenicians, Egyptians and Arabs voyaged over it, while in 1486 the Portuguese rounded the Cape of Good Hope. In 1498 Vasco da Gama reached the coasts of India by the same route, and in 1521 one of Magellan's ships crossed the southern part.

Indian Pipe, a smooth, pale, wax-like plant, practically leafless. It is shaped much like the stem and bowl of a clay pipe with a flaring mouth. At first sight one would call a colony of them a clump of mushrooms, but close examination shows that the flower is like that of the wintergreen, pyrola, and blueberry. It is a member of the heath family. The entire plant turns black in drying. As might be suspected from its lack of coloring matter, the Indian pipe grows on the roots or rotting bodies of other plants, appropriating the food prepared by them to their own use. Like the dodder it has no need, therefore, of green chlorophyll to digest plant food. See DODDER; PARASITE.

Indian Summer, in the United States and Canada, a name applied by general consent to a hazy, smoky, warm spell of weather expected late in autumn. The cold weather which precedes Indian summer is called squaw winter. So far as the origin can be traced, the term appears to have arisen in western Pennsylvania about 1790, but the exact origin is not known. In the West the term is supposed to indicate the season when the Indian went hunting for buffalo and other game to lay in his winter's meat. The Dakota Indians, at least, counted on a time of this sort along in October and November when fine hunting weather might be expected. Whatever its origin, the term is now well set in literature. A line or two from Lowell's *An Indian Summer Reverie* is expressive of the season's rare beauty:

What visionary tints the year puts on,
When falling leaves falter through motionless air
Or numbly cling and shiver to be gone!
How shimmer the low flats and pastures bare.

How fuse and mix, with what unfelt degrees,
Clasped by the faint horizon's languid arms,
Each into each, the hazy distances!
The softened season all the landscape charms;
Those hills, my native village that embay,
In waves of dreamier purple roll away,
And floating in mirage seem all the glimmering farms.

From gold to gray
Our mild, sweet day
Of Indian summer fades too soon;
But tenderly
Above the sea
Hangs, white and calm, the hunter's moon.

In its pale fire
The village spire
Shows like the zodiac's spectral lance;
The painted walls
Whereon it falls
Transfigured stand in marble trance!

—*John Greenleaf Whittier.*

Indian Territory, a tract of land set apart in 1830 for Indian reservations. It occupied the region now included in the State of Oklahoma. The five civilized tribes: the Cherokee nation, the Chickasaw nation, the Creek nation, the Choctaw nation and the Seminole nation were settled in this territory, each under its own government. A large part of the territory was purchased from the Indians by the Government in 1889 and thrown open to settlement. In 1906 the tribes owning the remainder of the land voted to unite with Oklahoma, and Indian Territory became a memory.

Indian Turnip. See JACK-IN-THE-PULPIT.

Indiana, "The Hoosier State," is one of the North Central states lying between Illinois on the west and Ohio on the east, and extending from Lake Michigan and Michigan on the north to the Ohio River on the south. Its greatest length is 280 miles, its width 140 miles and its area 36,354 square miles. It is the 37th state in size and the eleventh in population in the Union.

SURFACE AND DRAINAGE. Indiana forms a part of the great Mississippi basin and the general slope of its surface is toward the south and west. The highest point, about 1,250 feet, is in the northeastern part of the state. A small area of low land lies around the head of Lake Michigan and is separated from the region of the south by a low height of land. Much of this low land was formerly swamps; these have been drained and now form valuable farms for raising vegetables. In the northeastern part of the state there are a number of small lakes which have become popular summer resorts. Bordering on Lake Michigan is a region of sand dunes that is of particular interest to botanists because of its distinctive flora. In 1923 the Indiana legislature voted to purchase 2,000 acres of this region for a state park. South of the divide separating from the others the streams that flow into Lake Michigan is a broad low level plain as far as the Wabash River. South of this the surface becomes rolling until in the extreme southern tier of counties it is broken and hilly. In these counties there are numerous, bold limestone bluffs and other peculiar formations, caused by the flow of underground rivers, which have greatly diminished in size or have become dry altogether. These underground rivers have formed caves, the most noted of which is the Wyandotte, the second largest known cavern in the world. (See WYANDOTTE CAVE.) Formerly the central portion of the state was covered with hardwood forests but most of these have been exhausted and only small detached forest areas are now found.

The low land around Lake Michigan is drained into that lake, as is the extreme northern part of the state which is tributary to the St. Joseph River. The Kankakee River drains the northwestern part of the state. The Wabash, which flows diagonally through the state from the northeast to the south, constitutes the main river system. This with its tributaries, the White and Tippecanoe, drains a large part of the state into the Ohio River. The Maumee drains a small portion of the northeastern section into Lake Erie.

CLIMATE. The difference between the mean temperature of the northern and southern tiers of counties is about 9 degrees. In general the summers are warm and in the southern part of the state, hot. In the north the winters are cold but in the south they are mild. The entire state is subject to sudden changes of temperature because there are no mountains to break the sweep of the north and south winds. The average rainfall is 43 inches, 30 inches in the north to 50 inches in the south. The rainfall, however, is not evenly distributed, and July and August are likely to be dry.

MINERALS. Indiana contains extensive beds of bituminous coal. In 1921 it was the sixth state in the Union in the production of coal. The output of that year was about 27,000,000 tons. Natural gas and petroleum are found in large quantities but the production of natural gas is less than it was several years ago, since in some areas it has been exhausted. Indiana leads all the states in the production of limestone for building purposes. The quarries in Monroe and Lawrence counties produce 70 per cent of the limestone used for building in the United States. There are also valuable beds of clay, shale, and kaolin distributed through the state and their production is an important factor of the mining industry.

AGRICULTURE. Agriculture is the leading industry. The soil is fertile and the climate ideal for crops that grow in the temperate regions. There is but very little waste land in the state. The important cereal crops in the order of their value are wheat, corn, oats and barley. Large quantities of vegetables are grown in the northern part of the state tributary to the Chicago markets. Apples, pears, peaches and

other fruits are grown in the central part of the state and in addition to these in the southern counties large quantities of small fruits are raised. Live stock raising is an important branch of agriculture, and cattle, horses and swine of high grade are found in large numbers. Sheep are raised in the northwest counties.

MANUFACTURES. A group of cities around the head of Lake Michigan—Hammond, East Chicago, Indiana Harbor, Gary and Michigan City—form an important manufacturing center. The chief industry is the manufacture of steel and its related products. Large numbers of high class automobiles are also manufactured in the state. South Bend has the largest wagon works in the world. Indianapolis, Evansville, Terre Haute and Fort Wayne are important industrial centers. The manufacture of brick, tiles and pottery is one of the leading industries. Cotton and woolen goods are produced in a number of cities and there are large publishing interests at Hammond. The census of 1920 gave the following report of industries for 1919:

Number of establishments	7,916
Wage earners	1,095,000
Value of products	$1,898,753,387
Capital invested	$1,335,714,103

TRANSPORTATION. In 1921 there were 7,651 miles of main railroad tracks. The total mileage of electric railroad tracks was 1,981. Numerous trunk lines of railways, having their western termini in Chicago or St. Louis and their eastern termini in New York or Philadelphia, extend through the state in all directions. Electric lines connect all important towns and Indianapolis is a noted center for these lines. In the northern part of the state the highways are in excellent condition. All sections of the state, except the southern counties, are well supplied with transportation facilities. In the latter region the broken and hilly surface makes the construction of railroads exceedingly difficult and expensive. Indianapolis, South Bend, Fort Wayne and Logansport are important railway centers.

POPULATION. In 1920 the population was 2,930,390, an increase of 259,514 or 8.5 per cent over that of 1910. Of the ninety-two counties in the state 28 showed increases and 64 decreases. The urban population was 50.6 of the whole as against 42.9 in 1910. The number of inhabitants to the square mile was 88.3 as against 79.4 in 1910. The center of population for the United States in 1920 was in Whitehall, Owen County, eight miles west of Bloomington.

EDUCATION. Three great state institutions—Indiana University, at Bloomington, Purdue University, at Lafayette, and the State Normal School, at Terre Haute and a branch at Muncie, are a part of the public school system. Indiana University comprises a college of liberal arts, schools of education, law and medicine and a graduate department. It also maintains a summer school and a biological station at Winona Lake. The faculty numbers 200 and the enrollment is about 4,300. Purdue University has the state agricultural college. The entire faculty of the institution exceeds 240 and the enrollment is about 2,300. Other important universities and colleges include De Pauw University, at Greencastle, University of Notre Dame, Indianapolis University, Wabash College, Butler College, at Indianapolis, Franklin College at Franklin, Vincennes University, Rose Polytechnic Institute and the University at Valparaiso. St. Mary's of the Woods, at Terre Haute, is a noted Catholic school for women.

The township is a unit for organization in the elementary school system. Schools in each township are in charge of a trustee. The consolidation of small schools has proven of great benefit to rural communities. High schools are a part of the public school system and their number is ample for the accommodation of the youth of the state. In 1921 the tax levy for the support of elementary and higher education was increased and a teachers' pension law was enacted. The annual expenditure for education is about $60,000.000.

INSTITUTIONS. The charitable and penal institutions are under the supervision of a board of state charities composed of non-salaried members appointed by the governor. Hospitals for the insane are located at Indianapolis, Logansport, Rich-

mond, Madison and Evansville. There is a school for the feeble-minded at Fort Wayne, a soldiers' and sailors' orphan home at Knightstown, a colony for epileptics at Newcastle and a school for the deaf and a school for the blind at Indianapolis. The state penitentiary is at Michigan City. The state reformatory is at Pendleton, the boys' reform school at Plainfield and the girls' reform school at Claremont. At Indianapolis there is a prison for women.

GOVERNMENT. The present constitution was adopted in 1851. The legislature consists of a senate of 50 members elected for four years, and a house of representatives, which may not exceed 100 members, elected for two years. The legislature meets once in two years and sessions are limited to sixty days.

The executive department comprises the governor, elected for four years, and a secretary of state, attorney-general, auditor, treasurer and superintendent of public instruction elected for two years. The governor may not suceed himself. The judicial department comprises a supreme court, an appellate court, circuit court and a system of county and justice courts. Juvenile courts have been introduced into the larger cities.

HISTORY. The region comprising the northern part of the state of Indiana was explored by La Salle and a number of French missionaries and traders in the latter part of the 17th century. It is probable that the first white men entered the state about 1679. The first permanent settlement was made at Vincennes in 1727 and by 1734 it had somewhat increased. The Treaty of Paris in 1763 brought Indiana and all the region east of the Mississippi under the control of the British; but the French were not disturbed until 1777 when an expedition, under George Rogers Clark, took possession of Vincennes. Ten years later, Indiana became part of the Northwest Territory. In 1800, Indiana, Illinois and Michigan were organized as the Territory of Indiana. Michigan was separated in 1805 and Illinois in 1809. Since the latter date the boundaries of Indiana have not changed.

In the period immediately following the Revolutionary War the Indians were hostile and the settlers were in constant danger until in 1794 United States troops under General Wayne defeated them and put an end to Indian hostilities for a number of years. In 1811 there was another uprising under Tecumseh, who was defeated by General Harrison at the Battle of Tippecanoe. With the exception of the attempt to organize an uprising at the outbreak of the War of 1812.

Indiana became a state in 1816 and, with the exception of the panic of 1837, from that time until the present its history has been one of peaceful, uninterrupted progress and prosperity. The centenary of the state's admission into the Union was celebrated in 1916. During the World War Indiana furnished 121,000 men to the United States army and 5,516 men to the United States navy. The total subscription to the five Liberty Loans and in thrift stamps during the war period amounted to $498,000,000, an average of $166.00 worth of bonds for every man, woman and child in the state.

Indiana is justly noted for the large number of eminent men who have appeared during her history from the day of William Henry Harrison, first governor, and later President of the United States, to the present time. Among her political leaders we mention former President Benjamin Harrison, and Vice-Presidents Thomas A. Hendricks, Charles W. Fairbanks, Thomas Marshall, James E. Watson and Albert J. Beveridge. Among her writers who have attained more than a national reputation are Edward Eggleston, George Ade, James Whitcomb Riley, John Hay, Joaquin Miller, Charles Major, Booth Tarkington, Lew Wallace, Maurice Thompson, Gene Stratton Porter, Albert J. Beveridge and David Graham Phillips.

The primitive life of the old settlement of Vincennes has been told with much fidelity by Maurice Thompson in *Alice of Old Vincennes,* while Edward Eggleston, in the *Hoosier Schoolmaster, The Hoosier Schoolboy* and *The Circuit Rider* has written in a charming vein of life in the "bottom-land" of Indiana during the middle of the last century.

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Land area, square miles	36,045
Water area, square miles	309
Forest area, acres	4,000,000
Population (1920)	2,930,390
White	2,849,580
Negro	80,810
Chief Cities:	
Indianapolis	314,194
Fort Wayne	86,549
Evansville	85,264
South Bend	70,983
Terre Haute	66,083
Gary	55,378
Muncie	36,524
Hammond	36,004
Kokomo	30,067
Anderson	29,767
Richmond	26,765
Elkhart	24,277
Number of counties	92
Members of state senate	50
Members of house of representatives	100
Salary of governor	$8,000
Representatives in Congress	15
Assessed valuation of property	$2,233,761,065
Bonded indebtedness	$340,000
Farm area, acres	20,948,981
Improved land, acres	17,393,982
Corn, bushels	169,848,000
Wheat, bushels	24,14[illegible],000
Oats, bushels	45,072,000
Hay, tons	2,429,000
Rye, bushels	3,978,000
Tobacco, pounds	12,250,000
Clover seed, bushels	68,000
Wool, pounds	5,306,000
Domestic Animals:	
Horses	591,289
Mules	96,476
Milk cows	724,313
Other cattle	534,865
Sheep	591,289
Swine	2,238,618
Manufacturing establishments	7,916
Capital invested	$1,335.714.103
Raw material used	$1,174,950,568
Output of manufactures	$1,898,753,387
Coal, tons	27.000,000
Cement, barrels	10,700,000
Quarry products	$ 4,657,000
Miles of railway	7,707
Teachers in public schools	20,707
Pupils enrolled	577,432

Indianapolis, the capital of Indiana, is the county seat of Marion County and the largest city of the state. The city is on both banks of the White River, 183 miles southeast of Chicago, and 109 miles northwest of Cincinnati, in almost the exact geographical center of the state. It is one of the great railroad centers of the Union, and is served by the Illinois Central, Lake Erie & Western, Big Four, Pennsylvania and numerous other important lines. An interurban system radiates from Indianapolis to almost every important point in the state, and extends into Ohio, Illinois and Michigan.

CITY PLAN. The area of Indianapolis is about forty square miles. The city is situated in a rolling, well-timbered region about 700 feet above sea level. The surrounding country is rich in coal and limestone, and is very valuable as agricultural land. The streets are broad, well kept and shaded, several of them radiating from the circular plaza at the center of the city known as Monument Place. The center of this plaza is occupied by a stone and bronze shaft 285 feet high surmounted by a colossal "Victory"; at the base of the shaft are two great fountains. The monument was erected as a memorial to America's military and naval heroes. Near the monument are bronze statues of General Clark, President Harrison, Governor Whitcomb and Oliver P. Morton, all of whom figure largely in the history of the state. The parked area of the city is about 1,560 acres. Six beautiful bridges span the river within the confines of the city. Immediately to the north is the Benjamin Harrison Army Post; and the famous Indianapolis motor speedway is near the city.

BUILDINGS. The State capitol is an impressive structure built of Indiana limestone. The Federal building, the central library, the court house, citty hall, Art Institute, Union Station, Coliseum, Masonic Temple and Traction and Terminal Building are especially noteworthy. Indianapolis is the seat of such state institutions as the Indiana Prison for Women, State School for the Deaf, State School for the Blind and the Central Hospital for the Insane.

INDUSTRY AND COMMERCE. Indianapolis ranks next to Detroit in the manufacture of automobiles, and is the greatest live stock center in the Ohio Valley. Its location near rich deposits of coal and oil has helped to make the city one of the leading industrial centers of the Middle

West. Meat-packing is one of the principal industries. Iron, flour, grist, lumber, furniture, clothing, wagons, printed matter, engines, drugs, milling machinery, starch and a host of other commodities issue from the city's manufactories. A flourishing trade in live stock, farm produce, and other goods adds to the wealth of the community.

EDUCATION. Besides the thoroughly modern public school system, which includes several high schools and a normal school. Indianapolis contains the Art School, Indiana Law School, Indiana Central University, University of Indianapolis, Indiana Dental College, and Butler College, the medical department of Purdue University.

Settled in 1819, Indianapolis was a town of 8,091 inhabitants in 1850, while in 1920 it had a population of 314,194.

Indians, the red men whom Columbus found inhabiting the New World. He called them Indians because he supposed the country to be India. Students thought for a time that some tribes, as the Aztecs, the Eskimo, and the Mound Builders, belonged possibly to the Mongolian or to the Malay race, but they are now well agreed that all the inhabitants of the New World at the time of its discovery by the white race were Indians. The most highly civilized tribes were found in Arizona, Mexico, Yucatan, Colombia, and Peru. It has been suggested that their civilization is Asiatic in origin, but there is little to support such a theory.

Next to these tribes in rank are the Indians with whom the American colonists first came into contact. The subject of classifying the tribes is a difficult one. There are twenty-two Indian dialects or languages in California, thirty in Mexico and Central America. There are fifty-eight Indian languages north of Mexico. Ethnologists are unable to bring the native languages of the two Americas into fewer than 133 groups. While there is a general similarity, the characteristics of the Indians as a whole are difficult to state. The head may be either round or long. The two forms are mingled beyond separation. The jaws are heavy and project slightly; the nose is large and is straight or aquiline; the cheek bones are more or less prominent; the eyes are small, straight, and black; the complexion is coppery, shading off to yellowish and brown. The hair is much like that of the Mongolians. It is long, straight, and coarse. The beard is scant. The height varies greatly. Some tribes are low and squatty. The Patagonians are among the tall people of the world. In disposition the Indian is austere, moody, too proud to show emotion, and wary. He has little capacity for mathematics or science, and but moderate ability in learning to read. So far as known all the tribes believe in a multiplicity of deities. The more highly developed tribes offered human sacrifices. Elsewhere their religion was largely nature worship. All the languages and dialects exhibit a common tendency to group many simple words into compound words of prodigious length. Nothing of the sort has been found elsewhere in the world.

The Indian families are too numerous to be described. The Eskimo was long thought to be an Indian, but exhaustive research has constantly tended to show that he is not. Of all North American Indian families, there are five that are for one reason or another more interesting than the others. First are the Athabascan Indians. Including the Chippewas, the Apaches, and the Navajos, they are scattered over a large part of northwestern Canada and Alaska. They extend in spots down the Pacific coast and through the Rocky Mountain region, as far as Mexico. The Snake or Shoshonean family, including the Bannocks, Comanches, Utes, and Moquis, extends from Oregon and Idaho to southern California and Texas. Sioux tribes, including the Crows, Mandans, Assiniboins, Winnebagos, Omahas, Catawbas, and Biloxis, have occupied various regions from the Rocky Mountains to the Carolinas and from Hudson Bay to Arkansas. The Creek family included the more important Indian tribes of the South,—the Creeks, the Choctaws, the Seminoles, and the Chickasaws,—ranging from Kentucky to Florida.

The Indians of literature are the Algonquins and the Iroquois. The Algonquins

AMERICAN INDIANS

Chief Black Thunder

Chief Tall Man Dan

occupied the greater territory. Their tribes were to be found from Labrador to South Carolina, and from the mouth of the Ohio northwesterly to the Rocky Mountains, and farther north among the Athabascans. The Crees, the Ojibways, Blackfeet, Cheyennes, Arapahos, and Powhatans were all of Algonquin stock. Pocahontas, King Philip, Pontiac, Tecumseh, and Black Hawk were members of the Algonquin family. The colonists adopted many Algonquin words, such as chipmunk, hickory, hominy, hammock, moccasin, mugwump, opossum, papoose, cuckoo, skunk, squaw, tammany, terrapin, toboggan, tomahawk, totem, and persimmon.

The traditions of the American Indian, with his war paint, and dances, deerskin dress, his bow and arrow, his tent and his canoe, are drawn largely from the Algonquin tribe of Indian.

Next in traditional importance are the Iroquois. They were of all Indian families the most warlike—the most given to the use of the scalping knife. Their chief habitat was the basin of the St. Lawrence. Lakes Huron, Erie, and Ontario were theirs. Their chief tribes were the Hurons, Mohawks, Senecas, Cayugas, Onondagas, and Oneidas. These, excluding the Hurons with whom they were most of the time at enmity, constituted the Five Nations, or later with the Tuscaroras, the Six Nations. As Champlain took the part of the Hurons, these other tribes allied themselves with the English during the French and Indian wars. During the Revolution their sympathies were with the English and the Cayugas and Mohawks under Brant were active participants.

The far-removed Cherokees of the Carolinas were Iroquois. Their names linger especially in the present geographical names of New York, Pennsylvania, Ontario, and Michigan. Red Jacket and Cornplanter were Iroquois.

By the fourteenth census the Indian population of the United States is 243,000.

The official relation between the United States and the American Indians began in the Revolutionary period, and the government has at all times and in all its dealings with them attempted to be wholly generous and just to the Indians. Individual agents have often been very unfair, and the Indian has occasionally been given a piece of practically worthless land when his white neighbor coveted the rich land. About forty per cent of the Indians of the United States retain their tribal identity and are treated as nations within the greater nation.

The wealthiest American Indians are those composing the Five Civilized Tribes, upon whose Oklahoma lands are some of the most valuable petroleum wells in the Mid-Continent Field. As a usual thing, these Indians, when they attain to wealth, show a proper regard for the future of their sons and daughters and give them every opportunity to gain an education.

Canada. The interests of the Indians in Canada are carefully protected by the Dominion Government, to whom control of Indian affairs is reserved by the British North America Act. There, as in the United States, everything possible is done to make of the Indian a competent, intelligent citizen. In some of the Canadian provinces the ownership and occupation amount of improvement has been made entitles the Indian to vote. There are more Indian schools under government supervision in Canada than in the United States, but the attendance in the latter country is not as great. Both these facts are accounted for by the lack of concentration of the Indian population that obtains in the Dominion. Canada has many more, but much smaller, Indian reservations—or reserves, as they are there termed—than has the United States. Many of the Canadian reservations contain but a few acres, for the reason that the Dominion government has never adopted a policy of concentrating the Indians.

Recent Interest. As the number of Indians decreases, as the Indian's civilization becomes absorbed in that of his white neighbors or dies, interest in that civilization increases. In Mexico, especially, and among the Pueblos, students have worked for years to piece together the chain of Indian culture, in order that the future may know the Indian even after he is gone. Language, religion, laws, art—all

are scrutinized by competent scholars, and the literature on the Indian becomes richer year by year. See INDIAN EDUCATION.

Indigo, a blue dye contained in the leaves of about 250 different plants. It is obtained chiefly from the green leaves of the indigo plant of Asia, a member of the pea family. The cultivation of indigo was encouraged in South Carolina by the British. Production rose to 1,000,000 pounds a year, but the Revolution cut off the industry and it has not been revived. India led in the production of indigo, but the amount of this production has fallen off steadily for many years.

The United States buys about $3,000,000 worth annually for use in dyeing calico and other cloth. An indigo field looks something like a pink clover field. In the preparation of commercial indigo the green plant is piled in a vat and kept under water twenty hours until fermentation takes place, when the water turns green. The water is then drawn off to a second vat on a lower level, in which a second fermentation takes place. In the meantime the liquid is churned violently until the green turns to blue. The liquid is then allowed to settle. The clear water above is drawn off, the blue pasty fluid at bottom is drawn into a third vat, where the indigo is clarified and partly dried. It is shoveled up into large sacks to drain, and is afterward packed in small boxes about three inches square and set in the sun to dry. It is then ready for shipment. The wonder is that even by keeping the vats constantly full such quantities of indigo can be produced. The way in which indigo is prepared to dye cloth so that it will not rub off is an art in itself. Of late vegetable indigo has been supplanted to a large degree by indigo obtained from coal tar. About 75 per cent of the indigo now used in produced artificially, chiefly in Germany. See DYEING; CALICO; DYE STUFFS.

Indigo Bird, a sparrow-like bird. The male is clad in deep blue, with wings and tail black margined with blue. The female is brown—under parts whitish. It nests in bushes near the ground from the Mississippi valley eastward. Careless observers may mistake it for a bluebird. The male is a fine songster.

The indigo bird breeds as far north as Nova Scotia, but migrates to South America in the autumn. It frequents open spaces on the edge of forests.

Indoor Baseball. See BASEBALL.

Induction. See THINKING.

Induction, a term used in physics to denote the action of an electrified body or a magnet in producing an electrified condition or magnetism in another body without coming in contact with it. It is called electrostatic induction when a charged body brought near an insulated one causes a separation of the positive and negative electricity in it, the opposite in kind being attracted. The repelled charge, similar in kind, may be removed, when the second body is left oppositely charged. This is called charging by induction. When a magnet is brought near an unmagnetized piece of soft iron, the latter becomes a magnet by induction. Removing the magnet, the soft iron loses its polarity. The term electro-magnetic induction is applied to the power of a current to produce polarity in a piece of iron near it or around which it flows. Such a magnet is called an electro-magnet. Then again an intermittent current will produce a flow of electricity in a closed conductor near it. It is the change in the inducing current, which causes the second. This has given rise to the instrument known as an induction coil whereby a weak current automatically made and broken in a coil of coarse wire, produces one of much greater intensity in a coil of fine wire surrounding it. Transformers used in the transmission of electrical energy are mere induction coils.

Indus River, the most westerly of the great rivers of India. It rises in the unexplored regions of the Himalayas and flows in a general southwesterly direction into the Arabian Sea. Its upper waters are swift and pass in places through narrow, precipitous defiles. The walls of one gap in Cashmere are 2,000 feet in height. The lower valley of the Indus is not far from the boundaries of Afghanistan and Baluchistan. In portions of its course the Indus is much diminished in volume by loss of water through evaporation and sinking in

the sand. Much more is drawn away for purposes of irrigation. The delta is a sandy waste of little value. The Indus was reached, it may be remembered, by the forces of Alexander. On the whole its valley is not fertile. It does not compare favorably with that of the Ganges. The Indus has a total length of about 1,900 miles and drains an area of 360,000 square miles. It is considered one of the great rivers of the world, but it does not rank in size with the Ganges. In one part of its course it is twenty feet in depth and has a generous breadth; but in general, especially in seasons of drouth, it may be said to be a shallow river. The lower part of its course is navigable for steamers having a draft not to exceed seven feet and numerous boats frequent the ports. See INDIA; RAIN.

Industrial Insurance. See INSURANCE, subtitle *Industrial Insurance.*

Industrial Revolution. See FACTORY SYSTEM.

Industrial Schools, in general, a term including all schools which train pupils for the actual performance of any sort of manual labor. In Germany and other European countries, the various branches of industrial education have received careful attention for a century at least. In the United States, however, it is only within twenty-five or thirty years that the matter has awakened anything like general interest. The middle of the ninteenth century witnessed the beginning of a great change in social and industrial conditions. The introduction of machinery in manufactures led to a vast development of industries both as to method and as to quantity of production. At the same time there developed an increasing tendency to take industrial practices from the home and center them in the factory. The old methods of training, by which a child learned the beginnings of trade or handicraft in the home, and was then apprenticed to some master in his chosen line, became wholly inadequate. That the need of training for industrial pursuits was beginning to be felt was evidenced by the founding, in 1859, of Cooper Union, New York City. This school offered evening classes whose purpose was to "train mechanics in the skilful practice of their several trades, so that they could not only apply their labor to the best possible advantage but enjoy the happiness of acquiring useful knowledge." Similar institutions were equipped in other cities, and schools already founded opened evening classes.

Of somewhat different character are schools of technology, the first of which preceded Cooper Union by a quarter of a century. Rensselaer School, called later the Rensselaer Polytechnic Institute, was founded in New York in 1824, for the purpose of giving instruction "in the application of science to the common purposes of life." This school came to be known especially for its department of engineering, although its equipment for instruction in chemistry and physics was extensive, and scientific agriculture was taught also. Several technical schools of a similar sort were founded, among which may be mentioned the Franklin Institute at Philadelphia, and the O'Fallon Polytechnic Institute at St. Louis. The development of mining and railroading which began in the early 70's led to the establishment of other engineering schools, and schools of technology. The land grants and appropriations made to the states as a result of the Land Grant Act of 1862 and the Morrill Act of 1890 were for the purpose of promoting agricultural and mechanical schools, and led to a wide-spread development of this type of institution. Such schools are not so much to train the workman as the expert—the man who can design or devise mechanical constructions, and who can superintend production.

The first step toward industrial training as a part of the public school system was made about 1870, when manual training was introduced into many high schools, although with no purpose of vocational education, but merely as an element of culture and of general efficiency. During the next decade manual training was introduced gradually into the elementary schools until it is found in some form in every grade. The aim of such work, however, is wholly cultural. The idea of schools whose entire aim is vocational training has been agitated in an increasing degree since 1881, when the New York Trade School was established. Little progress was made

until 1901, when the number of such institutions began to increase rapidly. In 1907, the Milwaukee School of Trades was taken under the management of the city, and since that date Philadelphia, Worcester, and Portland, Oregon, and many other cities have opened similar schools.

Another variety of vocational school is the part-time school. The plan of such institutions is coöperative, the student paying for the instruction he receives by giving a portion of his time in labor along his chosen line. The engineering school of the University of Cincinnati is conducted on this plan, which is in successful operation also in Rochester, Albany, and New York City. The "short course" offering training in agricultural subjects and in domestic science and domestic art for a portion of the school year, has become a feature of many city high schools. It is for the benefit, especially, of students who are unable to attend school during the entire year, and of those who are beyond school age. It is meeting with marked success. An intermediate vocational or industrial school for the better fitting for actual life of those boys and girls who cannot have, or do not desire, a high school course, is felt to be a need of our educational system. Specific vocational training as a part of the regular high school course is also receiving consideration.

All these movements show that we are coming to realize that while universal education is a good thing, education which is cultural only, cannot be universal, and if it could, is not the education most needful to fit the average boy or girl for the duties and happinesses of life.

"It is dangerous to attempt to educate a live boy with no reference to the vocational."—E. Davenport.

"The backbone of an education must always be the ability to do something."—W. J. Oliver.

Inertia, that property of matter by virtue of which it resists a force tending to disturb its condition as to rest or motion. It is the statement in one word of Newton's first law of motion, that a body at rest remains at rest, and a body in motion continues to move in a straight line with uniform velocity, unless acted upon by an outside force. A child on a sled, if the rope is suddenly jerked, is left sitting on the snow; or a boy on horseback, if the horse suddenly stops, pitches over its head. These illustrate inertia.

Infanticide, ĭn-făn′tĭ-sīd, the killing of young babes. The life of a child was by no means sacred in the eyes of the ancients. Plato taught that a defective child should not be reared. In the various Greek republics it was considered an excusable act, if not a duty, to put an end to a maimed child. The Roman father decided whether the child should live or perish. The old Norse viking took the new born child on his arm, looked it over, and decided its fate. Until put a stop to by British occupancy, the women of India destroyed their infants, girls especially, with shocking freedom. Infanticide is still practised, it is said, in the South Sea Islands and among the natives of Australia. The Chinese are accused of the same crime. In civilized countries the killing of a young child is regarded as murder and is punished as such. In Paris and other cities foundling hospitals receive unwelcome children. That the temptation to infanticide may be lessened, babes may be secretly placed in a drawer in a hall to be taken out by an attendant on the other side of the partition.

Infantile Paralysis, an infectious disease, which, on account of its increased prevalence during the last few years, has become a serious problem to physicians and health boards. The disease affects children chiefly, although adults are not exempt, is communicable to a moderate degree, and is epidemic. Its symptoms are fever, headache, restlessness, and rigidity of the neck, while vomiting often occurs, and pain in back and limbs may be present. In the majority of cases paralysis appears early, sometimes the first day, affecting the lower limbs, sometimes the arms, rarely the face. The disease is sometimes fatal and complete recovery occurs in comparatively few cases, one group or more of muscles remaining paralyzed. The disease demands the advice of a physician from the onset. The specific bacillus causing infantile paralysis has not been demonstrated under the microscope, although in infected animals it has been located in the spinal cord. the brain, the nasal mucous

membrane, and the salivary glands. It has been proven also that it is not affected by cold or drying, but may be killed by heat, and by weak disinfectants.

Infantry, foot soldiers. The word means literally the infants—the boys—referring, no doubt, to the page of medieval warfare who followed the knight, if at all, on foot. It is said that the main force of the ancient oriental army was mounted. Effective infantry was developed on Grecian soil. Soldiers protected by armor were called hoplites by the Greeks. They carried a long spear and dagger. The famous Greek phalanx of from 2,000 to 4,000 men was developed from infantry of this sort. The Roman legion succeeded the phalanx. The Germans who overthrew the Roman Empire used a foot soldiery. On the continent of Europe in the eighth century, this gave way to heavy-armed cavalry—the feudal "knight" and "men-at-arms." As stated the mounted medieval knight was followed by footmen. With the invention of guns and powder the foot soldier sprang into importance. Gustavus Adolphus, Wallenstein, Frederick the Great, Napoleon, and Wellington won their victories with infantry.

During the Great War our infantry division was increased to more than 3,000,000 officers and men. But at the close of the war, it was reduced to 4,200 officers, and 110,000 enlisted men. The pay of an infantryman of the first class is $74 a month; second, third and fourth class infantrymen receive less pay. The chief of infantry is a major-general. Other infantry officers receive from $4,000 to about $2,000. See ARMY, subhead *United States Army.*

Influenza, or **La Grippe,** an epidemic disease of a catarrhal nature. The disease first became epidemic in America in 1889 although in the East and in parts of Europe it appeared as early as the sixteenth century. There are many types of influenza and as almost any part of the body may be attacked its symptoms are difficult to describe. In general they are at first like those of a severe cold. Often a chill is experienced, sneezing, coughing, sore throat, headache, and rise in temperature may occur, while the characteristic pain of the disease, in the limbs, back, and sometimes entire body, is present in a greater or less degree. The disease is believed to be due to a minute bacillus. Its period of incubation is short, from twenty-four hours to three or four days. The acute stage of the disease lasts about three days. The germ is too small to be microscopically discovered. That it is air or wind borne seems impossible, because experiments show the virus does not survive if separated from an animal body. Its virulence is not great when uncomplicated, but the tendency of pneumonia to follow is very great and fatal to one-half its victims. Global influenza appears about three times in a century, the intervening epidemics being of a milder type like ordinary grippe. Authoritative statistics show 350,000 civilian deaths from influenza in the United States between September 15 and December 4, 1918; 17,000 in the army; 6,000,000 victims for the world.

Infusoria, ĭn-fū-sō′rĭ-a, minute animals abounding in waters that contain decaying animal and vegetable matter. They are protozoa which are ciliated either through life or in the young condition. Some authorities therefore call them *ciliata.* The form of the body varies. Like other protozoa it consists of a single cell, which may be roundish, kidney-shaped, ovoid, vase-shaped, trumpet-shaped, or flattened. Some are free-swimming; others are attached to stones, weeds, or sticks by a stalk. Still others are parasitic. In some species the stalk is quite firm; in others it is very contractile, and can coil like a cork-screw when the animal is stimulated in any way.

Like the amoeba, the body consists of soft, transparent protoplasm; but, unlike the amoeba, this protoplasm is surrounded by a thin but firm wall, so that the shape of the body can not be so readily altered. From the outer layer of the protoplasm fine, thread-like projections extend through the wall into the water in which the animal lives. These thread-like projections are called cilia (singular, cilium). The cilia aid in locomotion and also in getting food. The arrangement of the cilia is not the same in all infusoria. In some species the cilia are small, nearly equal in size, and distributed in rows all over the body of the animal. In others the cilia are of un-

equal size, the larger being found usually near the place where food is taken in; the rest of the body being covered with small cilia. In still others a row of large cilia is found near the mouth-end, the rest of the body being quite naked. In the so-called highest form of infusoria, the cilia take the form of hooks, fans, bristles, and plates with fringed ends, and are much bigger and stronger than ordinary cilia. They are, therefore, used by the animal much as an insect uses its legs; and it is a highly interesting and amusing sight to see, under a powerful magnifying lens, a few of these tiny creatures apparently crawling about on bits of algae.

In addition to cilia some forms possess various other external structures. In some forms minute sacs lie side by side in the cortex or outer layer of the protoplasm. A long, whiplash-like thread or cilium is coiled in each of these sacs, and when the animal is irritated in some way these whiplashes are quickly thrown out in defense.

Infusoria contain one or more nuclei of various shapes. The number of contractile vacuoles also varies from one to a hundred or more. These may be scattered all over the cortex or arranged in one or two rows. In some forms the vacuoles have a star-like arrangement, and it is a most fascinating occupation to watch these vacuoles fill, and then disappear, ten times or more in one minute. It is thought that the animal gets rid of surplus water or of excretions in the body by means of these vacuoles.

Infusoria do not ingest food by surrounding it, as do the amoebae. In forms which are not parasitic there is a definite mouth or depression through which food enters. Food consists of small algae or other small organic particles found in water. In some forms there is also a definite place through which waste matter is ejected; but a definite anus seems to be lacking.

Stalked infusoria can move only as far as the length of their stalk permits; but free infusoria move rapidly through the water, either with a straight, shooting motion, or in a wavy, undulating fashion. There seems to be as great a difference in manner of movement among infusoria as there is difference in manner of movement among birds. Both make a valuable study.

Reproduction among infusoria takes place almost exclusively by means of a simple division or fission, one animal dividing into two equal or nearly equal parts.

The infusoria received their name from the fact that they are usually found in infusions; that is, in water in which hay, grass, or other organic material is in soak. Some interesting forms can be gotten for observation in one's own room by placing a handful of hay in a jar and pouring cold water over it. In a few days the water will be teeming with miscroscopic ciliated animals. Infusoria are found in rivers, lakes, ponds, or streams, and also in the salt water of ocean or sea.—ELLEN TORELLE.

See PROTOZOÖN.

In'galls, John James (1833-1900), an American statesman. He was born at Middleton, Massachusetts. As a boy he studied under private tutors and in the schools of Haverhill; later he was graduated from Williams College and in 1857 was admitted to the bar. The struggle over slavery which was then taking place in Kansas interested him so greatly that he removed to Atchison, where he took an active part in the movement for a "free" state. In 1861 after Kansas had been admitted, he became secretary of the state senate, and the next year was elected a member of that body. After ten years as editor of an Atchison paper, he was sent to the national Senate, where he served for eighteen years. There he was distinguished for his brilliant speeches, full of ready repartee, and for his parliamentary ability, which latter distinction he earned during four years as president pro tem of the Senate. His death was regarded as a distinct loss.

Ingelow, in'jĕ-lō, **Jean** (1830-1897), an English poet and novelist. Miss Ingelow was born in the old town of Boston, Lincolnshire. Although she wrote from an early age reputation came only with the publication of a volume of poems in 1863. The more famous of these poems are *High Tide on the Coast of Lincolnshire, Songs of Seven, Supper at the Mill,* and *Divided.* She published several other books, among them *Stories Told to a Child, Mopsa, the Fairy, The Little Wonder Horn, A Story of Doom,* and *Other Poems. Off the Skelligs* was her first novel of any length.

Fated to Be Free is a sequel to it. It is said that her writings have been more popular in America than in her own country.

As the voice of Mrs. Browning grew silent the songs of Miss Ingelow began, and had instant and merited popularity. They sprang up suddenly and tunefully as skylarks from the daisy-spangled, hawthorn-bordered meadows of old England, with a blitheness long unknown, and in their idyllic underflights moved with the tenderest currents of human life.—Stedman.

Ingersoll, Ontario, Canada, a manufacturing town sixty-one miles southwest of Hamilton, on the Canadian Pacific and the Grand Trunk Railroads. It has interurban connection with Woodstock and other neighboring towns. A large part of the articles of Ingersoll's commerce comes from its manufacturing establishments. The chief products are tools, agricultural implements and machinery, woolen goods, pianos, nuts, fertilizer, flour, condensed milk, cheese and packing house products.

Ingersoll is a thoroughly modern town with three primary schools, a collegiate institute, a manual training school, a technical night school and a library. There are several hotels, and the city has two public parks. In 1921 the population was 5,150.

In'gersoll, Robert Green (1833-1899), an American lawyer, orator, and author, known most widely by reason of his opposition to the Christian religion. He was born at Dresden, New York, and was the son of a Congregational minister of somewhat liberal views. He was educated in the common schools of New York and Illinois to which latter state the family removed in 1845. After leaving school he studied law and was admitted to the bar. In 1860 he was nominated for Congress by the Democratic party. He served two years in the Civil War rising to the rank of colonel. In 1864 he changed his politics, joining the Republicans and becoming a campaign speaker for that party. In the National Republican Convention of 1876, Ingersoll acquired sudden fame by the speech in which he nominated James G. Blaine for the presidency. This marks the beginning of his career as an orator. After 1876 Ingersoll's life was spent in practicing law in Washington and New York and in lecturing and public speaking. His friends believe that he might have won great political advancement had he not injured his opportunity by his attacks on Christianity. However that may be, Ingersoll was by nature pre-emintently an orator. All those gifts—of commanding physique and attractive features, of sympathetic voice, telling gesture, of quickness of thought and smoothness of utterance, of flashes of humor and touches of pathos—which help to give a public speaker irresistible power with his audience, were his. No lecturer of his day spoke to such great and applauding crowds. Stories are told of lectures where thousands of people sat spellbound for hours.

In his private life Colonel Ingersoll was much beloved. His home is described as having been ideal. A friend says that even the cats and dogs in the Ingersoll household seemed happier than the animals of other homes. As a lawyer and speaker Ingersoll earned a large sum, his annual income averaging for some years about $100,000. He gave so generously, however, that he seldom had much money on hand and he died a comparatively poor man. When his friends urged him not to give in response to every request for money lest he be cheated, he replied that he would rather be cheated a dozen times than to leave a poor girl to suffer and perhaps to die whom he might have helped.

Ingersoll's published works include a large number of lectures, some poems and miscellaneous writings. *The Bible, The Gods, Some Mistakes of Moses, Foundations of Faith* are titles that may be mentioned. *The Plumed Knight* and *A Vision of War,* are famous short speeches which are quoted frequently.

Ingoldsby Legends, The, a collection of burlesque poems and stories by Richard Harris Barham, an English clergyman. They were published in *Bentley's Magazine* and *The New Monthly Magazine* over the pseudonymn of Thomas Ingoldsby. The first series of *The Ingoldsby Legends* appeared in book form in 1840, the second and third series in 1847.

Inheritance, in law, property passing to an heir on the death of an ancestor. Also applied to property then received. An inheritance differs from a bequest. The latter is received by reason of a direction

to that effect in the will of the deceased. The common law of inheritance is that all children of a parent shall inherit equally. Children born out of wedlock have no legal claims on the property of a deceased father. In case of death without children laws vary both at home and abroad. The property may revert to the father and mother or to the brothers and sisters. In case property would have been inherited by one who is dead it goes to his descendants or other heirs. An heir presumptive is, for instance, a younger brother who will inherit unless a direct heir, as a son or daughter, be born. On the birth of a direct heir the heir presumptive ceases to be an heir. In England to some extent, and in other countries among the landed classes, a law of primogeniture prevails. The first born son inherits the family estate. The purpose is to keep the estate undivided. A younger brother may be dependent, and, as a matter of fact, be driven into various occupations, as the law, medicine, church, or army, while the elder son is a man of wealth and rank. In case the holder of this estate die without a son the estate goes to the next younger brother if any. In the United States one may adopt a child and make it a legal heir, but in England, according to the old English adage and in accordance with the law of primogeniture, "God only can make an heir."

The English principle of primogeniture appeared, more or less fully, in all the American colonies of England. In Virginia and most of the South it prevailed in full. In New England the oldest son inherited a double share of the estate. These conditions continued until the Revolution. In Virginia Thomas Jefferson, after a strenuous contest of many months, succeeded in persuading the Virginia Assembly of 1777 to abolish primogeniture and entail. In the same year the democratic constitution of Georgia provided for the equal division of property among the heirs of an intestate. This provision was copied in the Northwest Ordinance of 1787 for the national territory north of the Ohio, and extended to later territory until it has become a general American principle.

See GAVEL-KIND; ADOPTION; SALIC LAW.

Inheritance Tax, in social science, a special tax levied on property at the death of the owner. As in the case of an income tax several terms require explanation. It applies to property inherited by law and to bequests. Direct inheritance rests on the relationship between parent and child. Property going to a grandparent, parent, child, or grandchild of the deceased comes under the designation. Property going to brother, sister, uncle, aunt, nephew, niece, or to their lineal descendants is considered a collateral inheritance. Small estates are, as a rule, exempted from paying an inheritance tax. A progressive tax is one the rate of which increases with the value of the inheritance. It is so graduated as to fall most heavily on the largest inheritances. Legislators look with favor on inheritance tax for several reasons:

1. By making proper exemptions and graduations the tax yields a large revenue without oppressing anybody.

2. Personal property which has been concealed during the life of the owner is brought to light. In such cases the levy may be regarded as back taxes, or a lump sum paid once in a lifetime.

3. The size of the estates transmitted to posterity is diminished. No just authority advocates the upbuilding of a class of those who neither toil nor spin, but who live as social drones on incomes derived from inheritances. The deeper the state cuts into such inheritances, the better it is for society.

4. Workingmen seldom begrudge wealth to one whom they have seen accumulate by honest and able endeavor. The maker of a fortune possesses usually characteristics that make him popular. The bookkeeper who has worked by the side of his employer and taken pride in the upbuilding of a great business feels bitter when he sees that wealth which he and his fellows have helped to create divided among heirs who have not helped and who are disposed to talk about clubs and ride in automobiles. It is the heir who is out of sympathy with the very people who made his wealth possible that the tax gatherer desires to strip of cumbersome wealth.

5. An inheritance tax reaching the verge of confiscation, in case of large bequests

and inheritances, has a tendency to encourage the distribution of fortunes during the lifetime of the accumulator whose judgment is likely to be superior to that of his heirs.

6. The inheritance tax is but a fitting return for the protection which the accumulator of a fortune enjoyed during the period of his business activity. This view regards society and the captains of industry as partners in a fortune to be divided at his death.

7. Still another argument is that which regards an inheritance tax as a tax levied on what is termed by Max West "a particular form of accidental income."

8. The strongest argument of all is that an inheritance tax cannot be shifted to the shoulders of labor. He who pays an income tax may be able to charge it up to the expense of production, and so adjust prices as to require the public to pay; or he may cut wages on the score of decreased profit; but the inheritance tax is like death itself, —it cannot be passed on to another. Property, not labor, must pay it.

Under one name or another an inheritance tax is an ancient form of taxation. It was levied in the days of the Roman Empire in order to secure funds for the support of the Roman armies, and the feudal lord exacted what was known as a "relief" when a fief passed into the hands of an heir. An inheritance tax is now general throughout the civilized world. The period from 1890 to 1910 was marked by the development of modern forms of this tax.

By the General Revenue Act, effective September 8, 1916, the United States levies an inheritance tax independently of such a tax imposed by the individual states of the Union. The act exempts an inheritance of $50,000 dollars or less, but imposes a graduated tax above that amount as follows:

Amount	Per Cent
First $50,000	1
$50,000 to $150,000	2
$150,000 to $250,000	3
$250,000 to $450,000	4
$450,000 to $1,000,000	5
$1,000,000 to $2,000,000	6
$2,000,000 to $3,000,000	7
$3,000,000 to $4,000,000	8
$4,000,000 to $5,000,000	9
Above $5,000,000	10

The tax is due one year after death; if not paid within the succeeding ninety days, a fine of ten per cent per annum for avoidable delay is imposed, and six per cent for unavoidable delay. If the tax be paid before it is due a discount of five per cent is given.

With the exception of the District of Columbia, New Mexico, South Carolina, Alabama, Florida and Mississippi, all the states of the United States also have some form of inheritance tax. In each state, however, the rates of tax and the conditions of exemption are different.

Initiative and Referendum, a joint method of continuing direct legislation after the voters have become too numerous or scattered to assemble in one gathering. The plan does not dispense with a legislative body. Initiative is the proposal of legislation by the people in an authoritative way. The details may differ, but in general initiative is a mandatory substitute for petition. Legislators elected by ordinary methods are independent. They may or they may not give respectful attention to a petition. Congress refused for years even to receive petitions for the abolition of slavery. Bliss states that a petition signed by several hundred thousand citizens and presented to the legislature of New York was rumpled up and tossed from one legislator to another. The initiative brings such legislators to time.

The referendum is a popular vote on the question of rejecting or confirming a legislative act. The referendum is applicable to the government of a city, a state, or a nation. Under this plan legislation may be enacted to take effect at a future date unless revoked by the people. If a percentage of say five per cent of the voters are sufficiently dissatisfied with an act to set the proper machinery in motion, a popular vote is taken. In Switzerland, where the referendum is in vogue, the national lawmaking body, being subject to the people, passes few laws. Popular votes have not been called for oftener than once a year. The referendum is applicable especially to municipal legislation. The rank methods by which streets are voted to corporations, and by which the interests of the people

are betrayed in granting franchises to gas, water, electrical, and traction companies, can be controlled and prevented by the simple expedient of publicity and of giving the people a chance to revoke objectionable measures.

Legislation by representation is not historical. The New England town meeting, the Anglo-Saxon folkmoot, the Swiss and German local meets, the Russian mir, the ancient Greek and Agora meetings, are examples of assemblies held to pass laws by direct vote of all citizens. The initiative and referendum is an attempt to get back as nearly as practicable to legislation which has the direct approval of the voters. The principle of the referendum is not new in the United States. In all states but Delaware an amendment of the constitution must be submitted to the people for adoption. This is what is known as obligatory referendum. The work of charter commissioners is submitted ordinarily to popular vote. Local option laws permitting communities to vote for or against license are based on the principal of referendum.

The initiative and referendum are in use in America. The colonies of Plymouth and Rhode Island actually tried the plan for a time and Massachusetts began the practice of a referendum in constitutional matters in 1778. Then, for some reason, the honor of developing the petition into a more effective form was left to Switzerland. Of late years American interest has been renewed. In 1891 a People's Power League was formed in New Jersey. It soon after took the name of the Direct Legislation League of New Jersey. Without doubt the occupation of New Jersey by the famous corporations and trusts of New York City gave impetus to the movement. In 1896 a National Direct Legislation League was formed for the spread of printed information. South Dakota adopted a direct legislation amendment to the Constitution in 1897. The first state of the Union to embody into its constitution the most advanced kind of initiative proceedings was Oregon. Other states followed this lead, and at present there are more than twenty with initiative and referendum laws, among them being North Dakota, Montana, Missouri, Oklahoma and Michigan.

Among foreign countries, the greatest progress in this direction has been made in Switzerland, which is sometimes referred to as the home of direct legislation. The states and cities of Australia and New Zealand have not been backward, and some progress has been made in Norway, France and England.

CANADA. The question of direct legislation, operating through the intiative and referendum, has been widely discussed in the various Canadian provinces for a number of years; but as yet few steps of a practical nature have been taken to realize the method.

The plebiscite, so often confused with the referendum, has been used in Canada, in order to obtain public opinion on some great issue, particularly prohibition of the liquor traffic. See RECALL; DEMOCRACY.

Injunction, a restraining order issued by a competent court to a corporation or an individual. Cases arise at law in which if the ordinary legal procedure were followed a great injury might be done to one of the parties. In such an event a federal judge may issue an injunction to prevent the injury. For example: If A were about to turn aside a stream which watered the cattle of B farther down stream, by the time a lawsuit about the matter were decided B's cattle would have died. But B could go at once to a federal judge and secure an injunction compelling A to leave things as they stood until the question of his right to turn aside the stream be decided at law. Rightfully used the injunction is a safeguard to individual as well as corporate rights; but there is an element of danger in it.

Ink, a writing fluid. Good ink should be free from sediment. When applied to paper it should penetrate so as to be difficult of erasure, but it should not have a tendency to spread. It should not fade with age. It is desirable also that ink should not have a tendency to mold, and that it should not corrode a steel pen. Black inks are, at base, usually iron or logwood. The former are the best.

A famous recipe for black ink is the following. One part by weight of bruised

nut galls; six parts of soft water; boil three hours in a copper kettle, replacing from time to time the water lost by evaporation. After settling, draw off, leaving the dregs behind, and add one-half part of common gum senegal and a half part of green vitriol. Thin with water to the required consistency. Allow the mixture to stand until it is nearly black; then bottle tight and put away for use as wanted. Logwood ink is made easily. Logwood may be boiled in soft water, or else extract of logwood may be used. When ink of a proper consistency has been obtained add one part in ten of ammonia or alum dissolved in boiling water. This gives a violet ink.

Red ink may be prepared by dissolving carmine in a solution of caustic ammonia. It evaporates very rapidly, however, and must be kept in closely stoppered bottles. A better red ink for ordinary purposes is made by steeping cochineal in hot soft water.

A blue ink may be compounded without difficulty by mixing one part of oxalic acid with eight parts of Prussian blue, and adding the mixture to water until the desired intensity of color is obtained.

India ink is prepared by the Japanese from pine soot and the lampblack of sesamum oil. This they mix with a liquid glue obtained from the hides of cattle. It is manufactured in sticks or cakes. It is used by artists, architects, engineers, and others who desire a superior ink for drafting purposes. A liquid obtained from the cuttlefish is used also for the same purpose. The indelible ink used by the housewife for marking linen may be made from silver nitrate, dissolved in water and ammonia.

For sympathetic ink, see COBALT. Printer's ink is so thick and sticky that it is hardly an ink. It is a superior paint. It consists chiefly of linseed oil, soap, lamp black, and naphtha. Vermilion is used as coloring for red ink; ultramarine for blue, and red chromate for yellow.

Man's need for writing ink arose with the introduction of papyrus, on which characters were formed by the application of colored fluids by means of a brush or reed. In earlier historic times the thoughts and actions of men were cut on stone, impressed on clay or wax, or carved on ivory, wood or metal; and while no writing fluid was needed for these methods, the word "ink" is derived from them. It is traced to the Greek word "encaustos," meaning "burnt in," through the Latin "encaustum," the purple-red ink used by the later Roman emperors.

The oldest writing material used on papyrus seems to have been composed of very finely divided carbon in a solution of some adhesive substance, which held the carbon in suspension and fixed it to the papyrus. Ink of this kind has been found on ancient Egyptian papyri, and was probably also used in ancient China. Carbon inks are permanent and strongly resist chemical action, but they require frequent stirring to prevent the carbon from sinking in the liquid. Printing inks consist mainly of carbon, with well-boiled drying oils and soap or resinous matter.

For ordinary writing purposes, however, carbon inks were superseded centuries ago by iron-tannin inks, prepared from a decoction of galls with copperas and gum arabic, formerly home-made, but now produced on an industrial scale. The action of the tannin, from the decoction of galls, on the copperas produced a preciptate, which being insoluble formed a deposit, but manufacturers avoided these conditions by excluding air to prevent oxidation, and by adding soluble coloring matter.

Good writing ink should remain sweet and fluid when exposed to air; it should remain permanent in light under ordinary atmospheric conditions, and not contain an excess of free acid, which would injure both pen and paper.

In the middle of the eighteenth century logwood was added to ink; in many cases it replaced the tannin entirely, and it still forms the basis of some inks. Colored inks have also been widely extended in manufacture and use, including blue ink from indigo; and with the introduction of coal-tar dyes in later years a large variety of easily running inks, specially suitable for fountain pens, have been made available, though it may be noted that they are not regarded as so permanent as the

iron-gallo-tannate inks. Many typewriter ribbons are prepared with coal-tar dyes, and are therefore open to this objection of lack of permanence, the ink being rather easily removed by chemical means.

Inks highly sensitive to tampering are sometimes employed for writing bank checks, especially in Great Britain, and the detection of forgeries often depends on the effects produced by treatment with various chemical reagents. Copying inks are concentrated writing solutions, usually containing two or three times the amount of coloring and thickening matter that is used in ordinary inks. The copying press, now little used in the United States (since the advent of the typewriter, with its carbon copies for file) was invented by James Watt in 1780, and he used an ink prepared from a decoction of Aleppo galls, green copperas and gum arabic, which is much the same as the inks now used in Great Britain and elsewhere for the same purpose, except that the latter contain soluble dyes, dextrine or sugar, and in some cases glycerine. Iron tannin inks, when exposed to the air, become oxidized and insoluble, so that they cannot be used for copying purposes.

The juices of various plants have long been utilized as marking inks, such plants including the ink plant of New Zealand and New Granada, the cashew nut, the Indian marking nut, and others. Modern marking inks, which should withstand the action of soap and alkaline and acid liquids, consist mainly of solutions of silver nitrate, colored with lampblack and thickened with gum. Salts of gold, platinum, manganese and of other metals have been used for the same purpose.

In 1920 there were 90 establishments in the United States engaged in the manufacture of printing inks, with an annual product exceeding $26,000,000. The manufacture of writing ink occupied 61 establishments, annual product about $6,500,000.

Inkerman. See CRIMEAN WAR.

In Memoriam, an elegiac poem by Alfred Tennyson, published in 1850 in memory of his friend, Arthur Henry Hallam, who died in 1833. The poem consists of a series of lyrics, written probably at different times, but all relating to some phase of his grief for his friend. Although *In Memoriam* was received with considerable criticism it has come to be regarded as Tennyson's most characteristic production, by many as his greatest production, and as the greatest elegy in the English language.

QUOTATIONS FROM IN MEMORIAM.

Oh, yet we trust that somehow good
Will be the final goal of ill.

But what am I?
An infant crying in the night
An infant crying for the light,
And with no language but a cry,

So many worlds, so much to do,
So little done, such things to be.

Thy leaf has perish'd in the green,
And while we breathe beneath the sun,
The world, which credits what is done,
Is cold to all that might have been.

There lives more faith in honest doubt,
Believe me, than in half the creeds.

The grave, majestic, hymnal measure swells like the peal of an organ, yet acts as a brake on undue spasmodic outbursts of discordant grief. —E. C. Stedman.

Inn. See HOTEL.

Innocent III, pope from 1198 to 1216. He was the greatest medieval pope. He reformed abuses of the church, extended the papal domains, excommunciated Philip Augustus of France for divorcing his wife, brought John, King of England, to terms, and made him confirm Stephen Langton as archbishop of Canterbury. He directed two crusades. He was a man of character and force, not only a natural leader of the church, but the most powerful monarch of his day. See PAPACY.

Inness, George (1825-1894), a noted American landscape painter. He was born at Newburg, New York. When fourteen he began to study drawing, and about three years later he worked for a firm of map engravers. In 1845 after a period of study in the studio of Regis Gignoux in New York, he opened a studio of his own. Through the generosity of a patron, the promising young artist was given a trip abroad, where he studied in France and Italy. Inness was much influenced by the painters of the Barbizon school, and his works show this leaning in their faithfu representation of nature.

His work won him recognition as the greatest American landscape painter. The coloring of his pictures is particularly beautiful. Inness' landscapes comprehend to a degree the unusual merit of making the beholder see the cloud changes, and feel the breeze blow. The elements of nature seem in vital action though but a spread of paint upon a bit of canvas. In 1894 an exhibit was held in New York of two hundred and forty of his works. Some of his best paintings are *Under the Greenwood, Close of a Stormy Day, An Autumn Morning, A Passing Storm,* and *Moonrise.*

His son, George Inness, Jr., is following in his father's footsteps. The son studied under the father in Rome, and later they had a studio together in New York.

Inns of Court, an English name for a college or building in which law students are lodged and taught. It is now restricted to the four inns of court in London. These establishments appear to combine the characteristics of law schools and regular fraternities. They appear to have been originally inns for students who desired to be near the courts of law. The four inns are Gray's Inn, Lincoln's Inn, Middle Temple, and Inner Temple. Each one consists of a governing body known as benchers, of barristers, or lawyers who have been admitted to the bar, and students. They have extensive buildings, with chambers, lecture rooms, large halls of assembly, and dining halls. Students are required to pay fees. After three years' residence they are entitled to an examination for admission to the bar. The exclusive right to examine students and admit them to the bar is given to these four inns. A student may, of course, choose his inn, as he would choose his law school; but he cannot be admitted to the bar in London without joining one of the inns.

Inoculation. See SMALLPOX; HAHNEMANN.

Inquisition, The, a name given usually to an organization in Spain for the detection and suppression of heresy. It is known also as the "Holy Office." It was established in 1480, in the reign of Ferdinand and Isabella, at Seville. At the beginning we may believe readily a sincere desire to weed out error and to win persons back from a wrong belief lay at the foundation. It seems equally certain that the lust of power and the desire to bring rivals to the dust actuated those in control. Two names in power, Tomas of Torquemada and Ximenes, are associated forever with a reputation for cruelty. The inquisitors were usually Dominican monks. Our knowledge of the inquisition is derived chiefly from Jesuit writers. It was aimed primarily at the Jews and Moors. Many of these were wealthy. Their property afforded a rich booty, which throws an additional suspicion on the sincerity of the inquisitors. During the first year of operation a local historian certifies that 298 victims were burned in Seville alone, and that no less than 2,000 were burned in the archbishopric. The Holy Office had no respect for persons. The wealthy Jew, the Moor, the peasant, the merchant, the priest, even a cardinal, were haled before the inquisitors.

Queen Isabella, though a zealous churchwoman, had a tender heart. "In the love of Christ and his Maid Mother," said she, "I have caused great misery and have depopulated towns and districts, provinces and kingdoms." In the reign of Charles V, her grandson, and his son, Philip II, the Holy Office extended its inquiries into the Netherlands. Many suffered also in Italy and Sicily. 30,000 executions took place in Spain alone. Although the inquisition fell off little by little as more modern ideas prevailed, it was not suppressed in Italy and Spain until the time of Napoleon. In fact a Jew was burned and a Quaker was hanged in Spain as late as 1826. In magnitude and ferocity the inquisition is unparalleled in the annals of history. An official burning of a heretic was known as an auto-da-fé, or an act of faith. In order to escape passing a partisan judgment, however, we have only to remember that atrocities very similar in character were perpetrated on a small scale in Puritan New England.

Insane Asylum. See INSANITY.

Insanity, a disordered condition of the mind. The ancients considered a loss of mind due to the bewitching influence of Luna, or the Moon, hence the words lunacy and lunatic. Loss of mental power is

due to any one of many causes and takes many forms. Insanity may or may not be accompanied by wasting away of the brain, that is to say, a breaking down of cells. Popular names for insanity consisting merely of derangement are melancholy, stupor, hallucination, mania, epilepsy, and hysteria. Melancholy is accompanied by depression; mania by unusual exaltation or similar mental acuteness. A third class of cases is entirely distinct from these mentioned. Weak-mindedness, idiocy, and imbecility are due to an undeveloped brain. We cannot speak of loss of mind in these cases, for the patients have never possessed well ordered minds, but are dull and incapable of other than physical routine.

In other forms of insanity there is a breaking down and wasting away of brain cells. The dementia sometimes noticed in extreme old age is of this sort. Certain grievous diseases bring about the same result. Insanity may be produced by sickness or a disease; it may be the immediate result of a mental shock, such as comes from loss of property, grief, fright, shame, religious enthusiasm, or political excitement. Some people go insane from living too much alone; others keep their minds too active, and are stimulated by overstudy or the excitement of society. The study of the various forms of insanity is one of the profoundest and most difficult subjects of medical inquiry. No reputable physician will claim to have mastered more than one form of insanity.

Modern treatment of insanity differs very greatly from the treatment of the last century, and the results are most gratifying. Since the advent of psychoanalysis, which threw a flood of light on the working of the mind, the hope for recovery of demented persons is greater than formerly, even though psychoanalysis is of aid only when the aberration is treated in its incipient stage.

Another, perhaps still greater, advance in this field was made by an American, Dr. Henry A. Cotton, of the New Jersey Hospital, who has proved beyond doubt that many forms of insanity have their bases in what often appear to be trifling physical disorders, such as infected teeth, disordered stomach, adenoids, etc., and that when these are corrected, the patient regains his mental health, frequently with startling rapidity. Dr. Cotton's findings were not at first acceptable to the great body of his contemporaries here and abroad, but his continued success has broken down the barriers of prejudice, and his methods are now widely applied.

Insecticides, substances used to destroy insects. Closely related are the fungicides. The former may be classified under these heads: 1. Gaseous insecticides, used against either biting or sucking insects as, hydrocyanic acid gas, carbon bisulphide, and tobacco smoke. 2. Contact insecticides, used mainly against sucking insects and those biting ones which will not eat foliage spread with internal insecticides. The lime-sulphur, kerosene, and soap washes belong to this class. 3. Internal insecticides, used against those insects that eat plants, and including the various arsenical compounds as Paris green, arsenate of lead, or arsenite of lime. Application of these various liquid insecticides is usually by spraying. See SPRAYING; BORDEAUX MIXTURE; PARIS GREEN.

Insects, an extensive order of the animal world. The word is Latin, having reference to the fact that an insect is cut into. An insect is divided into three regions: the head, the thorax, and the abdomen. The head bears a pair of feelers, or antennae; the thorax bears three pairs of legs and one or two pairs of wings. Insects can see, hear, feel, taste, and smell. They breathe and have a circulatory system. Their muscles are something wonderful. A single caterpillar has 4,000 different muscles. A flea is able to jump several hundred times its own length.

The compound eye, one on each side of the head, is made of many—50 to 5,000—small eyes, called facets, though some insects have simple eyes instead. It is thought that compound eyes enable insects to detect the slightest motion, but that no insect can see distinctly at a distance greater than six feet. The bright colors prevalent in the insect and flower world are supposed to be so many signal flags to

Blow-fly or flesh-fly.

Tsetse fly.

Horse bot-fly. a. an egg on a hair.
b. larva

Horse louse-fly.

Sheeptick.

Oxwarble and larva.

Aphis-eating fly,
with larva and pupa.

Horse-fly.

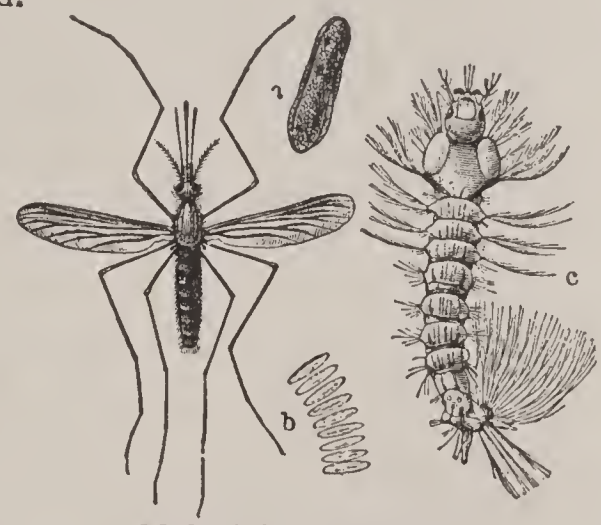
Sheep bot-fly.

Soldier-fly.

Midge and larvae.
one larva enlarged.

One of the common
mosquitoes and larva.

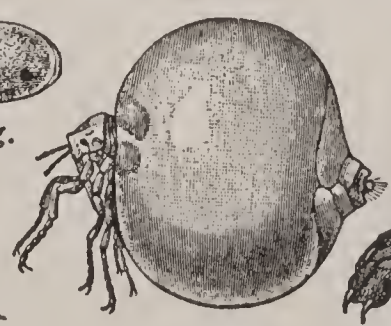
Army-worm and larva.



Malarial mosquito.
a. egg. b. eggs. c. larva.

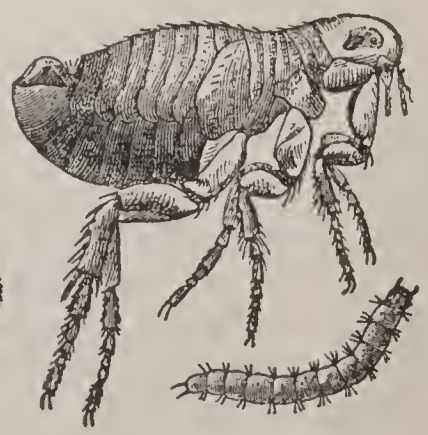
Sandflea.

Egg.



Sandflea,
swollen.

Leg of mouse
with sandfleas.



Flea and larva—
both enlarged.

INSECTS—TWO WINGED.

help out the eye of the insect. The skin is not sensitive like that of a person, but the insect feels by means of hairs connected with nerves at their base.

From the fact that insects are given to producing sounds apparently intended to attract their mates, it is argued that they hear. Some brown grasshoppers have what appear to be eardrums on the sides of the first segment of the abdomen. Katydids, crickets, and long-horned green grasshoppers have "ears" on their front legs. When the female mosquito "sings" the antennae of the male quiver, whence it is concluded that he is not deaf.

Insects have no tongue, but are thought to taste with the mouth parts. Insect powders must be flavored to their liking or sprinkled on attractive food, or else they will be rejected. The antennae, or feelers, are the organs of smell, rather than of feeling. It is thought that when an insect waves its antennae this way and that it is smelling, not feeling its way,—smelling the honey in the flower, not feeling its way to the cavity.

The growth and changes in the life of an insect are interesting, and are only beginning to be understood. The first stage is the egg placed by the adult where food is likely to be found. The young wormlike animal hatched from the egg is called a larva, plural larvae. The larvae of butterflies, moths, and millers are called caterpillars. The eggs of flies produce maggots, and grubs are the larvae of beetles, bees, and wasps. In its growth a larva sheds its skin repeatedly and grows a larger one. When full size has been attained, a matter of days or years according to the kind, the larva enters a third stage, usually of rest, called the pupa, either in the last skin of the larva or in a cocoon or mummy case of its own making. From the pupa stage, the full grown adult insect emerges and spreads its wings. In some cases, the process is abridged or condensed. In the case of the grasshopper, for instance, the young hopper hatches from the egg,—a miniature edition of the parent. It does not pass through the larva and pupa stages at all. Such an insect is said to undergo incomplete metamorphosis, and the young is called a nymph. The destructiveness of insects and the dread they inspire is due chiefly to the enormous capacity of maggots, grubs, and nymphs for green stuff, said in the case of some larvae to be 200 times their own weight each day. At that rate a fifty pound colt or calf would require five tons of hay every day of its existence.

Four-fifths of all animals are insects. Some 40,000 North American insects have been named and described. Perhaps a quarter of a million species are known to science, and it is estimated or conjectured that there are no less than 2,000,000 species of insects in the world. Small as insects are, their total bulk is greater than that of all other animals put together.

A few insects, as the bee, cochineal, and lac insect, have commercial importance. Many are indispensable to the fertilization of flowers; some, as the lady-bug and the ichneumon fly, render noble service in killing off other insects. Many flies, gnats, jiggers, hornets, and mosquitoes are exceedingly annoying to man and beast. Many animals die from bots. Other insects, moths, weevils, beetles, bugs, scale insects, plant lice—about 600 species in all—are pests in the conservatory, garden, field, and orchard. It is claimed that insects destroy $797,000,000 worth of property, counting timber, fruits, grain, and stock, in the United States alone, each year.

Insolvency. See BANKRUPTCY.

Insom'nia, a word of Latin origin meaning "without sleep," or "sleeplessness."

Insomnia is a symptom of various diseases, especially such as involve the nervous system. The cure consists in removing the cause. If one who is in apparent good health suffers from insomnia he must determine for himself whether his trouble is a result of indigestion, of too much excitement, too little exercise, or of other trespass of nature's laws. In general it may be said sleeping in the open air, and learning to relax in body and mind are the best remedies for sleeplessness.

Instinct, an inherited tendency to make certain responses in a definite manner. With this tendency to respond in a definite manner there is present also the physical structure involved in making the response, and the environment is usually such as to

INSECT FRUIT PESTS

1. Apple-flower Beetle
2. Twig Pruner
3. Vine Pruner
4, 5. Apple Chafers
6. Raspberry Beetle
7. Plum Borer
8. Cherry Fly
9. Fruit Tree Bark Beetle
10. Apple Roller
11. Apple-tree Web Moth
12. Grape Roller
13. Spring Worm Roller
14. Grape Pruner
15. Cherry Slug
16. Plum Saw-fly
17. Social Pear-leaf Wasp

act as a stimulating factor. The young duck has an instinct to swim. It is built for the water; its feet are paddles. If water is a part of its environment the duck is bound to swim. Tendency, structure, and environment are the three factors involved. But very often the instinctive response occurs in the face of unfavorable environment; a broody hen sometimes sits without eggs or nest, and a dog with a bone has been known to go through the motions of burying it on a stone floor.

Instincts may be classified as definite and indefinite. The instincts of lower animals are mostly quite definite; those of man are indefinite. Man may be said to have an instinct to imitate, but it is not definite; he may imitate almost anything. The robin has an instinct to build a nest; it is very definite; all robins build nests much alike. Another classification of instincts may be made on the basis of their time of appearance in the life of the individual. Some instincts are present at all times during life; such is the instinct for self-preservation. Other instincts re-appear from time to time as do the nest-building and brooding instincts of birds. Still others are delayed until complete physical development permits the responses they prompt, as in the case of the parental instinct of most animals.

Many responses of lower animals which seem to be the result of reasoning may be due entirely to instinct. The wonderful activities of bees are thought to be purely instinctive. Higher nerve centers such as reasoning involves need not be excited in making instinctive responses. The right nerve connections for such responses are probably inherited. Instincts are therefore racial rather than individual; they have sometimes been called race habits. Whether habits acquired by individuals may be inherited by offspring and thus finally become instinctive is a question which biologists have been unable to answer.

Insurance, the act or method of insuring or assuring against loss. The term is employed in various ways. It may and usually does refer to the system of business by which a company or corporation, called an insurance company, but sometimes an assurance company or society, guarantees the insured to a specified extent and under stipulated conditions against pecuniary loss arising from certain contingencies. If the contingency provided against be loss of or damage to property by fire or the efforts to extinguish fire, it is called fire insurance; if it be loss through death, it is life insurance; if by shipwreck or disaster at sea, it is known as marine insurance, and so on.

In its legal sense, insurance is a contract by which one party, for a consideration which is proportioned to the risk involved, undertakes to compensate the other for loss on a specified thing, from specified causes. The party agreeing to pay the compensation is usually called the insurer or underwriter, the other is the insured or assured. The consideration agreed upon is called the premium of insurance, the written contract is a policy, and the contingencies or possible events insured against are risks or perils; while the subject, right or interest to be protected is known to the law as the insurable interest.

The terms insurance and assurance have been used indiscriminately to some extent for contracts relative to life, fire and shipping; but "assurance" is now seldom used in the United States except in some cases relative to life insurance.

Insurance had its origin in the necessities of commerce and has kept pace with its progress. Its first principles appear to have been acted upon at a very early period. They were known in the days of the Roman emperors, and among the Anglo-Saxons the members of sundry "guilds," or social corporations, guaranteed each other against loss from "fire, water, robbery, or other calamity," on payment of certain fixed contributions of the nature of premiums. It was, however, to cover maritime casualties that insurance, in its commercial aspect, seems to have been first undertaken. Marine insurance may therefore be said to be the oldest type of the insurance business. As early as 1435 the magistrates of Barcelona in Spain issued an ordinance relating to this class of business, and in the speech of Lord Keeper Bacon, on opening Queen Elizabeth's first

parliament, we find the allusion, "Doth not the wise merchant, in every adventure of danger, give part to have the rest assured?"

Credit for being the first to apply mathematical calculations to the valuation of human life belongs to John de Witt, counsellor of Holland, whose report to the States-General on the valuation of life annuities was the scientific foundation of life insurance. The first life insurance company established in Britain appears to have been the "Amicable," founded in 1696; and this company still exists under another name. Today the insurance companies of Great Britain and the United States rank among the greatest financial institutions, and all forms of property, as well as human life and limb, are protected against loss or damage by indemnity contracts of insurance.

Life Insurance. A distinction is sometimes made between insurance on lives and insurance on visible property, on the ground that the former is simply an agreement to pay a fixed and arbitrary amount at the death of the insured, without reference to any actual damage, while the latter is an undertaking of indemnity for loss. This distinction, however, does not hold good if the real principles which underlie the policy of life insurance are understood. In the case of property insurance, the thing of which the loss is made good or modified is capital which produces income; in the other case, it is a life with physical and mental vigor sufficient to produce an income over and above the cost of subsistence. Many lives do not possess these qualities, and it is only with those which do that life insurance in its legitimate field has to deal. The termination of a life which can produce a surplus income inflicts a loss upon some one; and the greater the probable length of such production, the greater the loss must be.

It is clear therefore that before the insurer can fix the sum to be received for the agreement to pay some amount at an indefinite future time, he must not only know the time when his promise must be fulfilled, but he must be sure that the life in question belongs to the class from which his calculations have been drawn. Tables of mortality, based on records of births and deaths, etc., therefore necessarily preceded all contracts involving the probable length of a human life; and it is upon the basis of such tables, carefully and scientifically calculated by actuaries, that life insurance premiums for definite ages are fixed.

The oldest insurance company in the United States is the "Presbyterian Ministers' Fund of Philadelphia," chartered in 1759, but the first company to do a general life insurance business was not incorporated until 1812. Between 1843 and 1859 several companies were formed, and many others were established during the Civil War and the subsequent period of reconstruction. From 1875 to 1885 two distinct systems of life insurance appeared, both of which have played an important part in the development of the insurance business. These were, first, the system of assessment insurance, and second, industrial insurance.

Over 400 assessment companies were organized throughout the United States, and various plans of operation were adopted. Many of them, instead of collecting a fixed amount for each death, irrespective of age, as did the earlier English mutual-contribution societies, collected an assessment graded according to the age of the member at entrance. The aggregate amount of insurance in force in these associations in the year 1895 was about five billion dollars. Inexperience, lack of proper medical selection, faulty business methods, and various other causes led to the failure of many of these concerns. The laws governing life insurance companies having been amended to prohibit forfeitures in the event of failure to pay premiums, and correcting other abuses, the need for such associations ceased, and those that had been founded upon proper principles were reorganized and became regular "old-line" life insurance companies.

Industrial Insurance was introduced in the United States about 1876, and has proved to be an efficient form of life insurance. As the name suggests, it is practically limited to the so-called industrial

element, or wage-earning portion of the population of large cities. Briefly stated the essential principles of industrial insurance are: (1) premiums payable weekly; (2) payments collected from the home of the insured by an agent of the company; (3) the amount of insurance adjusted to the unit premium, instead of the premium adjusted to the amount of insurance; and (4) every member of the family from the youngest child to the oldest parent can be insured for a small premium, thus affording relief for burial expenses. The amount of such insurance in force in the United States has more than doubled in the last ten years. The premium payments in 1921 amounted to $283,148,000, payments to policy holders were $95,180,000 and the reserve increase for the year was $121,826,000.

The total number of life insurance policies in force in the United States in 1921 was 71,760,000, of which 17,663,000 were ordinary life policies and 54,097,000 industrial policies. The total amount of insurance was $44,384,658,000, of which $36,378,538,000 represented ordinary life policies, and $8,006,120,000 industrial insurance. These figures do not include life policies issued in the United States by foreign insurance companies.

Life insurance as a business now plays an important part in the financial affairs of the country, as well as in the solution of social problems. It is regulated by state laws, administered by state departments of insurance.

Life insurance policies are of many kinds, including the ordinary whole-life policy, the annual dividend policy, the endowment policy running for a stated term of years, policies payable in installments, policies payable in bonds, policies convertible into annuities, and other useful and popular forms of the insurance contract. Many corporations insure the lives of their officers, and some concerns insure all their individual employes. Life insurance is now universally regarded as a duty which every man owes to his family and to society, while an endowment policy is one of the most desirable investments for the young.

Fire Insurance. There are no records of fire insurance until after the great London fire of 1666, and for a long time after that it was conducted only as a vague and ill-defined business. Indeed it partook more of the nature of gambling than of business, for the early contracts of fire insurance were not limited to simple indemnity for actual loss or damage, and did not require an insurable interest in the property insured. Thus fire insurance languished until the age of steam. The invention of the steam-engine brought about an early and enormous concentration of values in manufacturing and commercial establishments, with a corresponding growth of cities and expansion of transportation and banking facilities. Then the importance of fire insurance began to make itself felt. Business was largely done on credit, and loss or damage to property entailed injury to all concerned in the credit system. Common prudence began to suggest to the banker, the manufacturer, and the merchant that insurance should be maintained as a condition precedent to credit, and the fire insurance business was soon recognized as an active member of the system of activities which constitute modern commerce. Fire insurance is therefore the child of advanced civilization, and it is today one of the most important safeguards of business.

At the present time thousands of corporations, big and little, are transacting the business of fire insurance in the United States, and annually many billion dollars of property values come under their protection. The personnel of the industry aggregates perhaps half a million persons. Fire losses in the United States in the year 1921 were estimated at $332,654,950.

Every piece of insurable property liable to be destroyed by one fire, as a building and its contents, is known as a "risk." It is possible for a fire insurance company to cover a number of risks under one policy, and this is often done. The amount a company is willing to insure on a given risk is known as its "line." A given risk may embody value to the extent of many hundred thousand dollars on which no conservative company would assume a line of

over $5,000. This makes it necessary for insurance agents who control such risks to represent a number of companies in order to accommodate their patrons, and it is not uncommon for an agent to represent as many as twenty companies.

Generally speaking, the care exercised by a well-managed fire insurance company in approving a risk is as great as that taken by a bank in passing on a loan. There is urgent necessity for this, for the facts are more numerous, obscure, and inaccessible, and the liability to loss through oversight, carelessness or error of judgment is just as great.

When a fire loss occurs under a company's policy, it becomes its duty to send a representative to adjust the loss with the insured under the terms of the contract. Then the policy holder as a rule begins for the first time to read his policy and file his objections; for the fire insurance policy has long been subjected to unfriendly criticism as a mass of confusing verbiage. Much of its language, however, has been imposed upon tthe companies by state laws. No attempt was made to insure uniformity in fire insurance policies until after the Boston fire of 1873, when the Massachusetts legislature formulated a standard policy which all companies transacting business in that state were required to use. This form was substantially adopted by most companies for use in other states. Later the State of New York appointed a joint committee, composed of legislators, attorneys, and practical underwriters, to construct a policy; and the result of their labors, known as "the New York standard policy," has since been made obligatory, with slight modifications, in most of the states, and even where not obligatory has been generally adopted by the fire insurance companies.

Briefly described, the completed fire policy in present use states the consideration or premium, amount insured, and time limit, and identifies the property by a written or printed description. If it is necessary to make the terms of the contract more liberal than its printed conditions, the point is covered by a written permit; or on the other hand, if it is necessary to impose conditions not mentioned in the printed part of the policy, these conditions are set forth as warranties on the part of the insured.

The printed part of the policy states that the company shall not be liable beyond the actual cash value of the property at the time of the fire, after proper deduction has been made for depreciation; that the loss shall in no case exceed what it would cost to repair or replace the property insured; and that in case the parties cannot agree upon the amount of loss, the company and insured shall each select an appraiser, the two so selected to choose a third, and that the award of these appraisers as to the amount of loss shall be decisive, it being optional with the company to repair, replace, or rebuild the property with other of like kind and quantity.

The policy then goes on to state in detail what will render it void, what it does not cover, how it may be terminated by either party, and what is necessary for the insured to do after a fire. This form of fire policy has not been materially changed for more than a generation. Its basic idea is that the insured shall not make money by his fire, or be able to turn his misfortune into a speculation; and all experience shows that this is a necessary safeguard to public interests.

Marine Insurance. This is the oldest form of insurance, and is effected by special companies in the United States and Great Britain, the oldest and best known of which is Lloyds of London, an incorporated association of underwriters, merchants, shipowners, shipbrokers, and insurance brokers, which had its origin nearly 250 years ago. The business is the insurance of ships and their cargoes against the perils of the sea. The form of the marine insurance policy in general use is one adopted by Lloyds in 1779, which has remained practically unchanged ever since.

The first marine insurance office in America was opened in New York in 1759, and the method of conducting business was similar to that of Lloyds, (which see) by individual underwriting of risks. Seveveral large companies later absorbed the business and individual underwriting

gradually became a thing of the past. Marine insurance for the Great Lakes is concentrated in Chicago.

When the European War broke out, in 1914, Congress established a Bureau of War Risks in the Treasury Department at Washington, to insure American ships and cargoes against loss or damage by risk of war, and funds were appropriated for the purpose. The functions of the Bureau lapsed with the conclusion of the war.

Marine insurance is effected either on a voyage from one port to another, under a "voyage policy," or for a stated period, under a "time policy." The insurer must have some interest in the ship, such as the profits of the voyage or the freight. When the policy is for a voyage, there is an implied warranty that the ship is seaworthy at the commencement of the voyage, but there is no such warranty in a time policy. The policy is understood to cover the risk, not only of the perils of the sea, properly so called, but also of ignorance or negligence on the part of the master or crew. But loss caused by mere wear and tear is not covered; the cause of the loss must be something happening by chance or accidentally.

Other Forms. Other forms of insurance which may be mentioned are (1) health and casualty insurance, under which the payment of a certain weekly or monthly sum is insured in cases of sickness or injury; (2) fraternal insurance, which is life insurance based upon a cooperative plan, usually having lodge features as an adjunct; (3) credit insurance, which undertakes to indemnify merchants and business men for losses through bad debts; (4) fidelity and surety insurance, by which bonds are given for the honesty of employees and public officials; (5) employers' liability insurance, which protects employers against claims for damages arising from accidents to their workmen; and (6) reinsurance, whereby insurance companies insure themselves against liability for the payment of claims in excess of their resources or a stated limit of maximum risk.

War Risk Insurance. A special form of war risk insurance for soldiers and sailors of the United States was provided by Act of Congress October 6, 1917, and amended December 4, 1919. This compensation for death or disability arising from service in the World War was designed as a substitute for the pension systems of previous wars. Soldiers and sailors on enlistment or on being drafted were permitted to take out government insurance in multiples of $500 from $1,000 up to $10,000, at very low rates of monthly premiums, deductible from their pay; and more than 4,000,000 officers and men availed themselves of the opportunity before the war ended with the signing of the Armistice on November 11, 1918. Policyholders were permitted to carry the government insurance for five years after the close of the war, and then to convert it into ordinary life, endowment or other forms of insurance in regular companies, under favorable conditions. In case of death or total disability the war risk insurance was payable in monthly installments to the beneficiaries.

Interest, a sum paid for the use of money. Excessive interest is called usury. Ordinary debts do not bear interest unless there be an agreement to that effect. In case A buys of B and promises to make payment at a certain date and fails to do so, B cannot collect interest. If, however, A has defrauded B and B sues, he may recover with interest. Money loaners have usually a higher rate of interest for a small sum than for a large one, for a short time than for a long time. The greater the risk, the greater the charge for interest; the better the chance for investment, the higher the rate of interest investors are willing to pay. School districts, cities, counties, states, and nations pay very different rates of interest. An old, well established community, fairly out of debt, can borrow a large sum on long time at a very low rate. A new town with an uncertain future must pay a much higher rate. The United Kingdom is one of the greatest borrowers in the world. It is considered such good pay that the British national debt bears only from two and one-half to two and three-fourths per cent interest. During the Civil War,

when the outcome was uncertain, United States bonds bore interest as high as seven and three-tenths per cent. Our bonds now bear from two to four per cent. The South American republics pay from three to five per cent. China pays as high as seven per cent. During the late war between Japan and Russia both countries borrowed heavily. The rate rose as high as six per cent.

The various states and provinces have fixed what is known as a legal rate which governs in the absence of an agreement to the contrary. Some states permit a higher rate of interest, say eight, ten, or twelve per cent, if agreed to in advance by both parties. The legal rate in nearly all states and territories is six per cent. The legal rate in Illinois, Louisiana and Michigan is five per cent; in thirty-one states of the Union, including the District of Columbia, the rate is six per cent; and in seven states, including Alaska, the rate is eight per cent, which is the highest. Some states impose a penalty for charging higher than the legal rate.

Capitalists often seek investments with a low rate of interest, providing they offer compensating advantages, such as unquestionable security, a long time of payment, and, in case of government securities, exemption from taxation.

The Liberty Bonds offered by the United States during the World War bore from 3.5 to 4.5 per cent interest and the Victory loan bore 4.75 per cent, and each issue was over-subscribed. Later many of these bonds were purchased by capitalists as desirable investments.

In recent years the investment in tax-exempt securities has become so large as to seriously affect the national income.

Interest, the affective side of attention. There is no interest without attention, and no attention without interest. They are different aspects of the same thing. Experiences which affect the mind pleasantly or unpleasantly are interesting. Such experiences receive attention. But interest may be either immediate or remote; it may be in the thing itself, or in the end to be gained by attending to that thing. A child's interest in a bright picture is likely to be immediate; his interest in a printed word is probably remote. He attends to the word because there is something beyond the word itself; he may be interested in the story or he may desire the approval of parent or teacher. This more remote interest is transferred, as it were, to the word which would otherwise receive no attention, and that word is likely to become immediately interesting because of the attention it receives.

To arouse worthy motives for attending to things which are not in themselves immediately interesting is the great problem of education. Fear of punishment may make a boy attend to his spelling lesson until he practically learns it, but such motive is not likely to result in interest in spelling. Turning the spelling lesson into a game is not much better. The motive should be natural and closely related to the spelling; if the boy is placed in a position where he will need to write those words in a letter for information which he really wants to secure, he may see some use in learning to spell. Then he may attend to spelling and become interested in it.

Many interests of young people are transitory but education of the right kind should establish in every one permanent interests in the great achievements of the race. He is not properly educated who lacks interest in language and literature, in science and art and religion, or in the great institutions of society. To realize such development of permanent interests schools must enrich their courses of study and connect school life with industrial and social endeavor outside of the school. The most recent changes in the schools are in accord with this idea.

Interference, a term used in physics for the phenomenon resulting from the combination of waves differing in phase. If two stones are thrown into water, the meeting of the concentric waves produces interference. A train of waves, set up in a rope by moving it up and down, meeting earlier ones reflected from the fixed end, produces interference, resulting in nodes and loops if properly timed. Two sound waves of equal length and intensity meeting in opposite phase may result in total silence, as in certain directions near a vibrating tuning fork. The interference of sound waves of different lengths gives rise

to the familiar "beats" as when C and D on a piano are struck at the same time. It is in light, however, that the most interesting results of interference occur. A familiar example is in the color of a soap film, oil on water, or cracks in ice. The light, upon striking the thin surface is partly reflected while a part enters and is reflected from the second surface. These meet in the eye at slightly differing phases, producing color which varies with the thickness of the film. Interference is of the greatest scientific importance, for as a result of this phenomenon mainly, was the wave theory of light established.

Interlude. See MIRACLE PLAY.

Internal Revenue, as used in the United States, the taxes raised by inland duties levied upon commodities, such as liquors and tobacco, or upon the pursuit of certain trades, sports, or occupations. In England the term used is "excise taxes." Internal revenue should be distinguished from customs duties, which form the government's other great source of revenue. Such taxes have been unpopular always, excepting those on liquor and tobacco, and never have been used largely except during the Civil War, when the people bore them patiently for the sake of a good cause.

International Date Line. See STANDARD TIME.

International Law, the body of law, resting upon custom, which regulates nations in their relations with each other. These relations involve three situations: the relation between peaceful states; the relation of hostile states to each other; and the relation of belligerents to peaceful states. Since communication has become so easy a matter, and a trip across the ocean an everyday affair, the necessity for mutual understandings and agreements between nations has increased. This need has been met by a gradual increase in the body of international law, established by treaties, arbitration conferences, and numerous international conventions. Only independent states, whose national law is practically like that of civilized European nations may become parties to international law. Japan is the only such nation in the orient. International law is enforced by arbitration, the withdrawal of diplomatic relations, the seizure of property, or, if necessary, by actual war. See NEUTRALITY; ARBITRATION.

Interstate Commerce, in the United States, as the name implies, commerce carried on between states or citizens of different states. Under the Articles of Confederation each state regulated its commerce with other states as best pleased itself, with the result of constant wrangling and strife. The constitution wisely provides that "Congress shall have power . . . to regulate commerce . . . among the several states." It further provides that the states shall be treated with equal fairness, and that no state shall lay any tax or duty upon the products of another state. Exception is made, of course, when inspection charges are necessary; then a fee to cover the cost may be required, and in the instance of goods harmful to the health or morals of a people, a state can, under its police power, forbid the entrance of such goods.

In 1887, the enactment of the Interstate Commerce Act virtually began the Federal regulation of railroads in the United States. The act created an Interstate Commerce Commission of five members, to be appointed by the President. It applied to interstate and foreign freight and passenger traffic carried by railroads or in the case of continuous shipment, by rail and water, but it did not apply to intrastate traffic, nor to interstate or foreign traffic carried entirely by water.

The Interstate Commerce Commission was vested with important powers with respect to the transportation systems of the country. Among other things, the Act prohibited pooling, or the combination of shippers or carriers to manipulate rates. It also prohibited all unjust personal discriminations in the form of special rates, rebates, or otherwise; forbade discriminations between localities, commodities, and connecting lines, and required the provision of reasonable and equal facilities for the interchange of traffic. The Act also provided that all charges should be just and reasonable, and required rates and fares to be printed and posted for public inspection.

Although the provisions of the law appeared to be sufficiently comprehensive, it never accomplished the results anticipated

by its framers, partly because, under the law the orders of the Interstate Commerce Commission were not binding upon the railroads unless a Federal court compelled obedience, but chiefly because the courts so interpreted its main provisions as greatly to limit its scope. But in spite of the failure of the law to accomplish the ends most desired, many beneficial results came from the legislation, among which were (1) publicity of rates, (2) reduction of the number of freight classifications, and (3) a better adjustment of charges, as between different shippers, different localities, and different commodities.

The next important step in the development of government regulation of interstate commerce was the enactment of the Elkins Act of 1903, which made corporations as well as their agents responsible for violation of laws relating to interstate commerce, and made deviation from the published schedules of rates the sole test of discrimination.

This was followed in 1906 by the Hepburn Amendment, which greatly increased the powers of the Interstate Commerce Commission, and extended the scope of the original act, making it applicable to express companies, sleeping-car companies, and pipe lines for transporting oil or other commodities except water and gas, and increasing considerably the things included in the terms "railroad" and "transportation." The law specifically invested the Commission with rate-making powers which had been denied to it under the interpretations which the courts had placed on the provisions of the Act of 1887. The prestige of the Commission was also greatly increased by a provision to the effect that all its orders except those for the payment of money should take effect within such reasonable time, not less than 30 days, as the Commission should prescribe. This law also conferred upon the Commission the power to prescribe a uniform system of accounts for railroads engaged in interstate commerce, and contained provisions further discouraging rebating of rates.

A step of great advantage to shippers was the enactment of the Carmack Amendment in 1906, since it required the carrier receiving freight for interstate shipment to issue a bill of lading for such shipment, and made it liable to the lawful holder of the bill for any loss or damage caused by any carrier over whose lines it might pass. The initial carrier was allowed to recover from the carrier on whose lines the loss or damage occurred.

In 1910 the powers of the Commission were still further increased by the Mann-Elkins Amendment. Among other things, this act vested the Commission with authority to suspend new rate schedules proposed by carriers until opportunity had been afforded the Commission to determine by investigation whether the proposed increases in rates were justified.

The Panama Canal Act of August 24, 1912, prohibited any railroad company or other common carrier subject to the act from owning, leasing, operating, controlling, or having any interest in common carriers by water or any vessel carrying freight or passengers operating through the Panama Canal or elsewhere, in competition with such railroad or other carrier. This Act also vested in the Commission the authority to require the connection of rail and water carriers where reasonably practicable; to establish through routes and maximum joint rates over rail-and-water lines; and to establish maximum proportional railroad rates to and from ports, etc.

Two other important measures affecting the railroads may be mentioned, namely, the Sherman Anti-Trust Law, enacted in 1890, and the Clayton Act, enacted in 1914. The Sherman Law made contracts, combinations in the form of a trust or otherwise, or conspiracies in restraint of interstate or foreign trade or commerce illegal. Many illegal combinations were dissolved after the passage of this law. The Clayton Act forbade all corporations engaged in interstate commerce to acquire stock of another such corporation where the competition might thereby be lessened, commerce restrained in any section, or a monopoly be thereby created of any line of commerce. It was expressly provided that the law should not apply to corporations purchasing such stock for investment

purposes solely, nor be construed as prohibiting a carrier, through the acquisition of stock, from aiding in the construction of short branch lines, nor prevent the extension of its lines through acquisition of such stock where no substantial competition existed between the purchasing and selling corporations. The Interstate Commerce Commission was vested with authority to compel compliance with those sections of the Clayton Act applicable to common carriers.

The membership of the Interstate Commerce Commission was increased by the Hepburn Amendment from five to seven, subsequently to nine, and in 1920 to eleven members, appointed by the President to serve for seven years, at a salary of $12,000 a year. Not more than six of the members are to be of the same political party. One new member will ultimately be appointed each year, as individual terms expire. The Commission has a secretary at $7,500 a year, and maintains an office with a large clerical force in Washington.

Before the United States entered the World War, the President was empowered, by an act of Congress approved August 29, 1916, to take possession and assume control of any system or systems of transportation and to utilize them to the exclusion, as far as necessary, of all other traffic, for the transportation of troops, war material and equipment, and for needful and desirable purposes connected with the prosecution of the war. Acting under the authority vested in him by this act, the President, on December 26, 1917, issued a proclamation assuming control of all systems of transportation located wholly or in part within the boundaries of the continental United States, such control becoming effective on December 28, 1917.

On March 21, 1918, the Federal Control Act was signed by the President. This act provided for the operation of the properties of the carriers during the war and for a reasonable time thereafter, not exceeding 21 months from the date of the President's proclamation of the exchange of ratification of the treaty of peace, and for compensation to the railroads for the use of their properties while under Federal control.

This legislation was designed only to meet the emergency conditions arising from the war and it was specifically provided therein that it was not to be construed as expressing the future policy of the Government concerning the ownership, control, or regulation of the carriers or the method or basis of their capitalization. When the war ended, it became incumbent upon Congress to enact the necessary legislation to bring about the return of the railroads to their original owners, and many plans were brought forward, designed to accomplish this result. Among these were plans offered by the railway executives; by the owners of railroad securities; by the railway brotherhoods, which, under the name of the Plumb plan, advocated the purchase of the railroads by the government and operation by the employees; by the National Transportation Conference, representing a composite of the ideas of the various interests involved; by the Senate Interstate Commerce Committee, known as the Cummins Bill; and by the Interstate Commerce Commission, known as the Esch Bill.

On December 24, 1919, the President isuued a proclamation relinquishing control and operation of the railroads, such relinquishment to be effective at 12:01 A. M. March 1, 1920. The approach of the termination of the period of Federal control emphasized the necessity for immediate action by Congress. As a result, the Senate passed the Cummins Bill and the House of Representatives passed the Esch Bill, each with numerous changes and amendments. Conferees of the Senate and House were appointed, and made a report which was approved by both houses and became a law on February 28, 1920, upon being signed by the President. This was the Transportation Act, under which the railroads of the United States are now regulated.

The Transportation Act, besides providing for compensation to the carriers for the use of their properties during Federal control, for a short period of guaranteed return, and for the establishment of the

Railroad Labor Board to adjust labor difficulties between railroads and their employees, made many important amendments to the Interstate Commerce Act. Among these was a provision whereby the Interstate Commerce Commission was directed to establish rates that would be adequate to provide the carriers with a fair return upon the value of their properties, and 5½ per cent was fixed as such "fair return." The valuation of the railroads for the purposes of the Act is now (1923) still in progress, having been started several years ago at the instance of Senator LaFollette of Wisconsin. Results to date indicate that the railroads have been undervalued instead of overvalued, and up to the present time they have not received anything like the return contemplated by the Transportation Act, except in the case of a few of the larger roads. High rates have been more than counterbalanced by the higher wages paid railway employees since the war.

Another important provision of the Transportation Act gave the Commission power to supervise consolidations and mergers of railroad companies into a limited number of systems, where such consolidations are decided to be in the public interest. A tentative plan for grouping the railroads of the United States, as was done in 1922 in Great Britain, is now (1923) under consideration.

Power to regulate the issue of securities by railroad carriers was also vested in the Commission by the Transportation Act. Another provision placed within its jurisdiction the use, distribution, exchange and interchange of locomotives, cars and other vehicles used in the transportation of property, including special types of equipment, as for example refrigerator cars, and the supply of trains.

Under its enlarged powers the Interstate Commerce Commission now undertakes the regulation of many matters that were formerly within the province of the individual States or resulted in a confusion of authority; and the railroads are apparently satisfied that the Act should have at least a fair trial, by the test of time. Radical agitation against the private ownership of railroads was, however, at high-water mark in the United States in 1923.

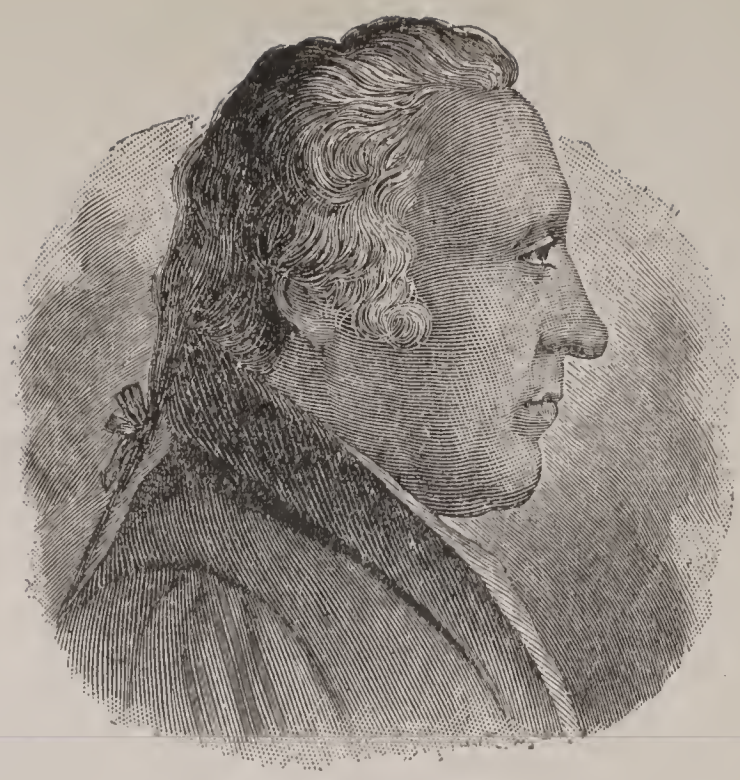
Intimidation, the act of compelling another or others to do or refrain from doing a certain act. In law, the use of such means to compel a person to enter into an obligation in some form, or to cause him to abstain from doing so by threats of violence of his life, or that of the members of his family, is illegal. Generally, obligations incurred under these circumstances may be repudiated, and money or other property parted with recovered in a quasi-contract action. Such contract, however, is not wholly void, but is so only at the instance of the party intimidated.

In English law, intimidation which results in compelling another to perform some illegal act, or causing him to refrain from some act which he has a legal right to do, is considered a statutory offense, and is punishable as a crime.

In the United States, intimidation is interpreted variously by the courts of the different states, some adhering more closely than others to the principles of the old common law. The decisions handed down are based on various points, as, for instance, the number of persons acting in concert to jeopardize or destroy the business of an individual or company, since, obviously, the same act committed by but one person, might render the result harmless or ineffectual. All points having any bearing on the matter are considered.

Intoxication, literally poisoning. The word is applied commonly to the condition produced by the excessive use of alcoholic liquors or of narcotics, such as opium or belladonna. A large quantity of liquor, especially if taken by one unaccustomed to its use may result in acute intoxication, which unless assistance is given promptly, will cause death in from thirty minutes to six hours. In sub-acute intoxication, the first effect of the liquor is to increase the circulation of the blood, as a result of which all the functions of both body and mind seem to be exercised with increased freedom. Bluntness of the sense of touch is likely to follow, with dizziness, and that loss of muscular control which leads to staggering. Temperamental peculiarities and faults of character are manifested with

Sir Henry Bessemer.



James Watt.

Alfred Krupp.

Nicolas Leblanc.

George Stephenson.

Sir Richard Arkwright.

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no apparent effort at their control. The mind seems to lose its power of associating ideas. The eyes see double sometimes and the hearing is affected. A prolonged sleep or stupor follows. On awaking, headache, nausea and mental depression are common. These symptoms vary in different individuals, and with the form and amount of alcohol taken. If immoderate indulgence in liquor be continued, the result is a case of chronic alcoholism in which nearly every organ of the body is affected. As alcohol is taken directly into the circulation, irritation is produced wherever it comes in contact with any tissue. If this irritation continues, new cells of connective tissue are formed, which lead to various diseases and disturbances in the functions of the various organs in which such growths occur. The heart, liver, and stomach suffer most perhaps, but in general the bodily strength decreases, there is loss of memory and will-power, and the result is mental and moral deterioration.

Many institutions exist for the treatment of chronic alcoholism. The method of treatment varies. In some cases the patient is shut off at once from any form of alcoholic beverage. In other cases the amount of liquor is diminished gradually. Sometimes liquor is given freely and even the food is soaked in alcohol until disgust for the taste and the odor is awakened. Quacks, also, profit by offering remedies. Many instances are on record of complete cures at these institutions, but in a large number of cases the cure is temporary.

Inventions, new contrivances, methods, and improvements. In the United States inventors are invited to make known their inventions at the Patent Office in Washington. A monopoly for seventeen years, known as a patent, is granted the inventor. The application must be accompanied by a model, if possible, and by a description, including drawings. Printed rules may be had on application. All civilized countries have a similar system. An international arrangement, embracing nearly all countries of the Postal Union, enables an inventor to protect his rights abroad. The first patent issued by the United States was granted in 1790 to Samuel Hopkins, of Vermont, for a process of making pearl ashes. It was signed by George Washington and looked like a college diploma. During the succeeding forty-six years 9,957 patents were granted by the United States. In 1921 over 41,000 were issued. The total up to 1922 is about 1,500,000. The patent office is a branch of the department of the interior. The Commissioner has a force of nearly 500 examiners and assistant examiners and a large number of clerks, bringing the total up to 700 or 800. Fees are charged. In 1921 over $2,275,000 was collected. The department is more than self-sustaining. Some of the principal inventions of the world are given in the following table:

Date	*Invention*	*Inventor*	*Place*
1438	Movable type	Gutenberg	Strassburg.
1643	Barometer	Torricelli	Italy.
1709	Thermometer	Fahrenheit	Danzig.
1745	Leyden jar	Kleist	Germany
1752	Lightning rod conductor	Franklin	United States.
1763	Spinning jenny	Hargreaves	England.
1769	Drawing rolls in a spinning machine	Arkwright	England.
1775	Steam engine	Watt	Scotland.
1777	Circular wood saw	Miller	England.
1783	Gas balloon	Montgolfier	France.
1784	Iron plow	Small	Scotland.
1785	Power loom	Cartwright	England.
1786	Soda	Leblanc	United States.
1787	Steam road wagon	Evans	France.
1788	Grain threshing machine	Meikle	England.
1792	Illuminating gas	Murdoch	England.
1794	Cotton gin	Whitney	United States.
1796	Lithography	Senefelder	Germany.
1801	Pattern loom	Jacquard	France.
1801	Fireproof safe	Scott	England.
1802	Planing machine	Branch	England.
1803	Steel pen	Wise	England.

INVENTIONS

Date	*Invention*	*Inventor*	*Place*
1806	Knitting machine	Jeandean	France.
1807	Steamboat	Fulton	United States.
1808	Voltaic arc	Davy	England.
1811	Breechloading shotgun	Thornton & Hall	United States.
1814	Locomotive engine	Stephenson	England.
1814	Kaleidoscope	Brewster	England.
1815	Safety lamp	Davy	England.
1815	Gas meter	Clegg	England.
1820	Quinine, use of	Caventon	France.
1822	Galvanometer	Schweigger	Germany.
1822	Calculating machine	Babbage	England.
1825	Portland cement	Aspdin	England.
1827	Friction matches	Walker	United States.
1831	Chloroform, use of	Guthrie	Scotland.
1832	Electric telegraph	Morse	United States.
1832	Electric motor	Sturgeon	England.
1834	Reaper	McCormick	United States.
1834	Carbolic acid discovered	Runge	Germany.
1836	Revolver	Colt	United States.
1839	Vulcanization of rubber	Goodyear	United States.
1839	Daguerreotype	Daguerre	France.
1843	Typewriting machine	Thurber	United States.
1845	Pneumatic tire	Thompson	England.
1846	Sewing machine	Howe	United States.
1846	Ether as an anaesthetic	Morton	United States.
1846	Guncotton	Schönbein	Germany.
1847	Lightning press	Hoe	United States.
1853	Electrolysis	Faraday	England.
1854	Diamond rock drill	Herman	United States.
1855	Safety matches	Lundstrom	Sweden.
1855	Cocaine	Gaedeke	Germany.
1855	Bicycle	Michaux	France.
1856	Steel	Bessemer	England.
1856	Sleeping car	Woodruff	United States.
1858	Cable car	Gardner	United States.
1862	"Monitor"	Ericsson	United States.
1862	Gatling gun	Dr. Gatling	United States.
1863	Smokeless gunpowder	Schultze	Prussia.
1865	Antiseptic surgery	Lister	England.
1868	Typewriting machine	Sholes	United States.
1868	Dynamite	Nobel	Sweden.
1868	Oleomargarine	Mege	France.
1868	Sulky plow	Slusser	United States.
1869	Railway air brake	Westinghouse	United States.
1870	Celluloid	Hyatt	United States.
1871	Welt shoe-sewing machine	Goodyear	United States.
1871	Grain binder	Locke	United States.
1876	Telephone	Bell	United States.
1878	Electric lamp	Edison	United States.
1921	Gas engine (compound)	Eickemeyer	United States.
1884	Linotype machine	Mergenthaler	United States.
1895	X-Rays	Roentgen	Germany.
1896	Wireless telegraphy	Marconi	Italy.
1901	Airship	Santos-Dumont	France.
1903	Flying machine	Wright Brothers	United States.
1915	Wireless telephone	Bell Co. Engineers	United States.

Agriculture was the chief occupation in the United States at the achievement of independence. . . . The men who tilled the soil here were the same kind of men precisely as those who filled the professions or were engaged in commercial or mechanical purusits. Of two sons of the same mother, one became a lawyer, perhaps a judge, or went down to the city and became a merchant, or gave himself to political affairs and became a governor or a member of Congress. The other stayed upon the ancestral homestead, or made a new one for himself and his children out of the public domain further west, remaining through his life a plain, hardworkng farmer.

But more even than the total effect of the fortunate condtions which have been indicated American agriculture in those days owed its

really remarkable productive power to a special, almost a technical, quality of our people, namely, mechanical insight and invention. It is difficult to write of this subject without producing the impression of exaggeration. There is only one nation in the world to the mass of whose population this form of genius can be attributed. That nation is our own. In other countries it is only picked men, a select few, who possess mechanical insight and aptitude, the power of instantaneously, because instinctively, seizing upon mechanical relations, together with a high degree of native efficiency in the use of tools. With us the rule is the other way: there are few Americans of American stock, at least throughout the Northern states, who have not mechanical insight and aptitude in a measure which elsewhere would make them marked men. As a great organ of English opinion has said, "Invention is a normal function of the American brain. The American invents as the Greek chiseled, as the Venetian painted, as the modern Italian sings." . . .

In inquiring into the genesis of this truly national trait we note, first, that the country was settled predominantly by men of the great inventive Teutonic race; and that, of this race, it was the most ingenious branch, the English, which furnished by far the largest part of the population of the Atlantic coast. Secondly, the early settlers constituted, in the main, a picked population. . . . To make shifts; to save time; to shorten labor; to search out substitutes for what was inaccessible or costly; to cut corners and break through barriers in reaching an object; to force one tool to serve three or four uses, and to compel refractory or inappropriate material to answer urgent needs—this was the constant occupation of our ancestors. Life was no routine, work was no routine, to them, as it is to the peasantry of every country of Europe, as it is fast coming to be among us. . . .

The mechanical genius of the whole people secured the progressive improvement of all the known tools and implements of husbandry, so that the American axe, the American spade and shovel, the American plough, and the American farm-wagon early became the best of their kind in the world, being little less than marvels of combined lightness, efficiency, and strength. . .

The way in which the pioneer, stopping his cattle in the wilderness and tumbling axe and spade, bundles, and barrels out upon the unbroken ground, set about the task of providing shelter for his children and his animals, clearing the ground and getting a first crop out of the soil, was not admirable merely as an exhibition of courage, faith, and enterprise, but, if we look at the results accomplished for the time and labor expended, it constitutes a triumph of mechanical, we might fairly say, of engineering genius.—Walker. *The Making of the Nation.*

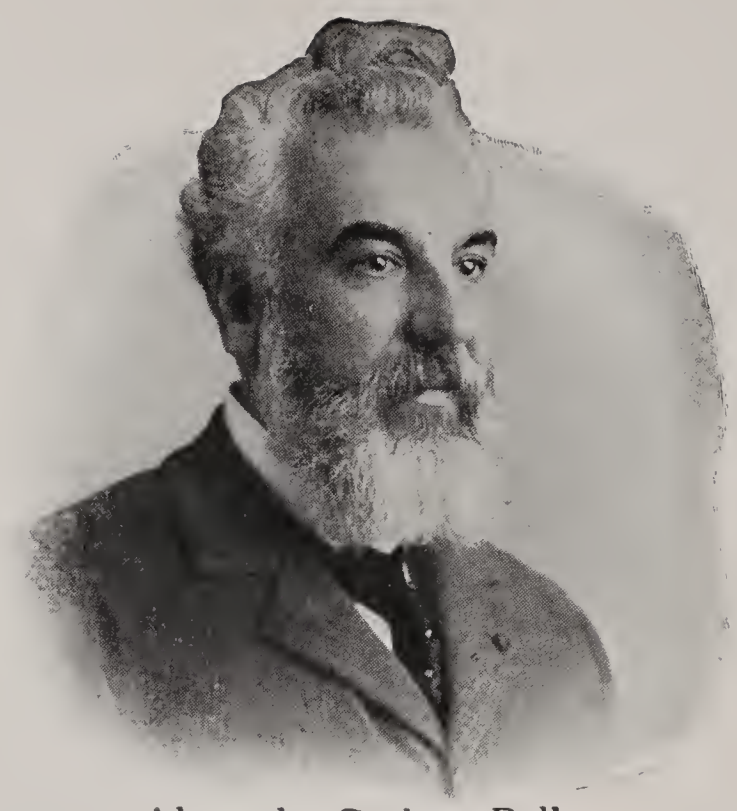
Our age is the age of electricity. The remarkable revolution which the practical application of electricity has effected in recent years is one of the wonders of modern life. To electrical engineering science the civilization of today owes more than is readily realized. It has solved many problems which modern conditions of life called into being, and which had to be solved if further progress was to be looked for. Professor J. A. Fleming, who has given fifty years to studying the problems of electricity, has said that the outlook for electrical engineering has vast possibilities "which may materialize at any time and make ancient history of our present achievement," great as that is. The records of the past half-century are wonderful enough; the next fifty years of electricity, it is interesting to learn from such an authority, "is a subject for attractive meditation."

Space and time have been almost annihilated; the transmission of energy, the development of production, and distribution of electrical power all suggest great possibilities. . .

The revolution which has been accomplished in modern life by electricity has been so quietly effected, so steadily accumulative, so all-embracing, that the ordinary man, perhaps, fails to appreciate the scope and the majestic proportions of the work of modern electrical engineering science. . . It would be a task even to enumerate the various spheres of the wonder-working activities of electrical power. It will drive the transcontinental express up the dizzy heights of the Rocky Mountains; it will haul trains of 800 tons weight over the mountain ranges of the Alps; it will flash its wireless messages across the Atlantic at the speed of 186,000 miles a second. Long submarine electric cables connect the most distant lands, but such cables become more and more dispensable. . . We cook by electricity, do our laundry-work by electricity, sweep our rooms by electricity, even the dentist's tiny drill is whirled around by electricity. We have electromagnets, powerful enough to lift ten tons of scrap iron; and the medical man may use a magnet to extract a fragment of steel from a workman's eye.—Professor J. Arthur Thomson, in *The Outline of Science.*

Io, in Greek mythology, the daughter of the river god, Inachus. Zeus admired the beautiful nymph and used often to visit her. One day when in her company he saw Hera, his jealous wife, approaching. He instantly transformed Io into a heifer. Hera was suspicious, however. She pretended to admire the heifer and finally asked Zeus to give her the beautiful creature. Zeus could not refuse. Hera gave the heifer into the charge of the hundred-eyed Argus. Zeus sent Mercury to Io's relief. Mercury succeeded in slaying Argus, but Hera now sent a gadfly to torment Io. The gadfly drove her over the whole world. She swam the Ionian Sea, which received its name from this circumstance and finally reached the banks of the river Nile. Hera

Samuel F. B. Morse



Alexander Graham Bell

Cyrus McCormick

Thomas A. Edison

John Ericsson

Robert Fulton

AMERICAN INVENTORS

at last consented to restore Io to the form of a nymph on condition that Zeus pay her no further attention. See ARGUS; HERA.

Iodine, ī′ō-dĭn, a chemical element akin to chlorine and bromine. It was obtained originally, 1811, from the ashes of a seaweed called kelp, but is now produced more cheaply from an earth abounding in the mountains of northern Chili. A ton of ashes of kelp yields about eight pounds of iodine. The name is Greek, signifying "like a violet." The solid is a soft, grayish substance, but its vapor is of a beautiful violet. Starch is used to detect the presence of iodine, and iodine is used in many experiments and botanical examinations to detect the presence of starch. A pinch of starch dropped into a glass of water containing a millionth part of iodine turns blue at once. Tincture of iodine—iodine dissolved in alcohol—is a valuable medicine. It is an irritating poison if taken in too large a quantity. Iodine kills the microbes of certain diseases. It is peculiarly valuable as an ointment for skin diseases. It is also used in photography in the preparation, of sensitive plates in the preparation of coal tar colors, and in surgery as a disinfectant.

Ions, a term applied to the elements of an electrolyte, or a compound body undergoing the chemical process of electrolysis, as in silver-plating and other industrial uses. Those elements of an electrolyte which are evolved at the anode, or positive pole, are termed *anions,* and those which are evolved at the cathode, or negative pole, are called *cations.* When these are spoken of together, they are termed *ions.* Thus, water when electrolyzed evolves two ions, oxygen and hydrogen, the former being an anion and the latter a cation. When the electric current is passed through water, bubbles of oxygen may be collected at one pole and bubbles of hydrogen at the other pole. Many scientists believe that free atoms of oxygen travel in one direction and free atoms of hydrogen in the opposite direction through the water. Hence, the term *ion,* which in Greek signifies a traveler, is applied to the atoms which travel to the two poles. The molecule of water consists of two atoms of hydrogen and one of oxygen, and the electric current splits up each molecule of water into the two groups of traveling atoms, going in different directions. The two kinds of ions, anions and cations, are believed to carry equal but opposite charges of electricity. The ion with a positive charge is attracted to the negative pole, and the ion with he negative charge of electricity to the positive pole. At the poles, or electrodes, each ion, whether an anion or a cation, is relieved of its electric charge and resumes its chemical status as an ordinary atom of gas. Science has even measured the speeds of the traveling atoms during electrolysis, and it is said that the heaviest ions move faster than those of less atomic weight; due probably to the fact that the slower ions carry along with them some molecules of water, or whatever the solvent may be. In the process of silver-plating, and similar arts, the practcial application of the theory of ions is seen. Thus a brass article, such as a fork, is dipped by a wire into a solution of silver cyanide in potassium cyanide, or some other silver salt. A small quantity of silver forms one of the electrodes or poles of the electric circuit—the anode. The fork is the other pole, or cathode. When an electric current is passed through the liquid bath, or electrolyte, positive ions of silver, or cations, are deposited on the brass fork, and it emerges from the electric bath as a silver-plated fork.

Iowa, "The Hawkeye State," a north central state of the United States lying between the Missouri and Big Sioux rivers on the west and the Mississippi on the east, and extending from Minnesota on the north to Missouri on the south. The general shape of the state is rectangular. From east to west its greatest length is 310 miles and from north to south 210 miles. The area is 56,147 square miles, making it just a little larger than Illinois. It is bordered on the east by Wisconsin and Illinois and on the west by South Dakota and Nebraska.

SURFACE AND DRAINAGE. Except where the surface is cut by streams into valleys, Iowa is an undulating plain or prairie. There are bluffs along the rivers and those

along the Mississippi are sufficiently bold and picturesque to attract more than passing attention. The highest land is at the northwest corner, and the lowest is the southeastern corner, near Keokuk. The entire surface slopes gently toward the south and east but there is a low divide separating the streams that flow into the Mississippi from those flowing into the Missouri.

The Des Moines river flows across the state in a southeasterly direction, and is the most important stream within its boundaries. About two-thirds of the state is drained into the Mississippi. Other streams flowing into the Mississippi are the Iowa, the Cedar, the Skunk, the Turkey and the Wapsipinicon. The Big Sioux, the Little Sioux, the Nishanabotna and the Nordway flow into the Missouri. In the northern part of the state there are a few small lakes, the most noted being Spirit Lake, Storm Lake, Cedar Lake and East and West Okoboji. All of these are favorite summer resorts.

CLIMATE. Iowa has a cool temperate climate with a mean annual temperature of 47°, but the region is subject to sudden and violent changes of temperature. In the north the winters are likely to be severe and the thermometer is known to fall to 40° below zero, while in the southern part in the summer it may rise to 100°. These extremes, however, are seldom met and when they occur are of short duration. In general the climate is healthful and invigorating. The average rainfall is 31.5 inches and it is quite evenly distributed through the growing season, thus supplying ample moisture for agricultural purposes.

MINERALS. The coal beds extend in a northwesterly direction along each side of the Des Moines river about three-fourths of the distance across the state. Their area is estimated at 19,000 square miles. Mining operations are carried on chiefly in the Des Moines valley and the annual output of coal is 7,500,000, nearly all of which is used within the state. Coal is the most important mineral and its mining by far the most important mineral industry. There are valuable lead mines in the northeastern part of the state near Dubuque, and brick and pottery clay is widely distributed throughout the state. In the central part of the state is a large deposit of gypsum valued in the manufacture of plaster of Paris, and as a fertilizer.

AGRICULTURE. Iowa has practically no waste land. The forest areas are confined to the banks of streams and 95 per cent of the land is in farms; of this, 86 per cent is improved. A deep fertile soil, easily worked, is found throughout the state. Temperature and rainfall are ideal for the production of those crops adapted to a cool temperate climate, and these conditions make Iowa one of the foremost agricultural states of the United States. The chief cereal crops in the order of their importance are corn, oats, wheat, barley and rye; hay, potatoes and sorghum are also important. Iowa competes with Illinois for first place in the production of corn. Some years one state is ahead and other years the other. She is second to New York only in the production of hay.

Conditions for raising live stock are excellent and Iowa is one of the foremost states in this branch of agriculture. The number of cattle in 1922 was 4,227,000; the number of horses 1,278,000; the number of swine 7,546,000, or 11 per cent of the number for the entire United States. The number of fowl reported was over 28,350,000, valued at $27,779,633. Only Texas exceeded Iowa in the number of cattle. Most of the stock is of high grade and dairying is one of the leading branches of agriculture. Extensive drainage works have been perfected for the redemption of swamp lands, these works including over 4,000 miles of open ditches and 10,300 miles of tiled drains.

MANUFACTURE. The census of 1920 gives the following data concerning manufacturies:

Number of establishments	5,683
Persons engaged	80,551
Capital invested	$403,205,513
Salaries paid	$124,161,129
Value of products	$745,472,697

Slaughtering and meat-packing is the largest industry. Manufacture of butter, cheese and condensed milk follow in the value of their production. Flour, break-

fast foods and other cereal products are produced in large quantities and foundry and machine shop products are increasing in quantity and value. The pearl button industry in the United States centers about Muscatine, the buttons being made from the shell of mussels found in large numbers in the Mississippi River and its tributaries. The Great Dam at Keokuk provides hydro-electric power which is distributed to numerous cities of Iowa and Illinois. While Iowa is not a manufacturing state its manufacturing industries have increased rapidly since 1910.

Transportation. The Missouri and Mississippi rivers are navigable and are used to some extent by the counties bordering upon them, but Iowa depends mainly on her railways for transportation. There are approximately 10,000 miles of main lines within the state crossing it from east to west and from north to south. The Chicago & Northwestern, Chicago, Burlington & Quincy, the Rock Island and the Chicago, Milwaukee & St. Paul are the largest systems crossing the state. Each of these lines has spurs extending in various directions so that no point within the state is over ten miles from a railroad station. Des Moines is the most important railway center. Interurban lines radiate from Des Moines and other large towns in various directions and have become an important factor in the transportation of passengers and freight.

Population. The census of 1920 gave Iowa a population of 2,404,021, which was an increase of 8.1 per cent during the decade 1910-1920. The urban population was 36.4 per cent of the whole. There were 43.2 inhabitants to a square mile as against 40 in 1910. Seven cities have a population of over 25,000, Des Moines, the largest, being the only city within the state whose population reaches 100,000.

Education. Three state institutions of higher education, the University of Iowa, at Iowa City; Iowa State College of Agriculture and Mechanic Arts at Ames; and the Iowa State Teachers' College at Cedar Falls, are at the head of the educational system. These institutions are under the management of a state board of education.

The University of Iowa comprises a graduate department, a college of liberal arts, school for nurses, a school of commerce, a school of music and colleges of law, medicine, homeopathic medicine, pharmacy, dentistry, applied science and education. The college of liberal arts also maintains a summer school for teachers and a lecture extension department. The faculty numbers about 500 and the enrollment averages 5,000.

The State College of Agriculture includes the state experiment station and besides the agricultural courses, maintains departments of veterinary medicine, mechanical and civil engineering, and mining, home economics and a department of manufacturing industries. The faculty numbers about 380 and the enrollment is 7,000.

There are numerous other colleges in the state, among which are Des Moines College and Drake University at Des Moines, Grinnell College at Grinnell, Upper Iowa University at Fayette, Charles City College at Cedar Rapids, Cornell College at Mount Vernon, Central University at Pella, Morningside College at Sioux City, Simpson College at Indianola and Coe College at Cedar Rapids. Most of these institutions are under the auspices of various religious denominations.

Between 1910 and 1920 remarkable progress was made in perfecting the public school system. In 1911 state aid was granted to high schools organizing normal training courses for teachers of rural schools. In 1917 the state board of vocational education was established and in 1919 the legislature provided for establishing part time schools for those pupils between the ages of fourteen and sixteen who were working on employment certificates. Legislation granting aid to large consolidated schools gave an impetus to the consolidation movement and in 1921 it was estimated that about one-fourth of the state area was organized into consolidated districts. A compulsory attendance law is rigidly enforced and the percentage of illiteracy in 1921 was about 1.1.

Institutions. Charitable and penal institutions of the state are under the su-

pervision of a board of control of state institutions, whose authority extends to all institutions of this nature whether under state or private control. Hospitals for the insane are located at Cherokee, Clarinda, Independence and Mount Pleasant. The institution for feeble-minded children is at Glenwood, a school for the deaf at Council Bluffs and a school for the blind at Vinton. There is a soldiers' orphan home at Davenport and a soldiers' home at Marshalltown. The state penitentiary is located at Fort Madison. There is a reformatory at Anamosa, an industrial school for boys at Eldora and one for girls at Mitchellville. A state sanitarium for tuberculosis patients is located at Oakdale.

GOVERNMENT. The present constitution was adopted in 1857 and since 1870 the people have had the opportunity of voting on the question of revising and amending it every tenth year. In 1920 the vote favored revision but the legislature did not act upon it. The initiative and referendum are in effect. The legislative department consists of a senate of 50 members and a house of representatives whose membership cannot exceed 108. Representatives are elected for two years and the senators for four years, one-half of the senate being elected every two years. The sessions are biennial. The executive department includes the governor, lieut-governor, secretary of state, auditor, treasurer, attorney-general and superintendent of public instruction, each elected for two years. The governor, secretary of state, auditor and treasurer form an executive council to which special powers are delegated. The judicial department consists of a supreme court, with a chief justice and six associates each elected for a term of six years, and district courts with from one to five judges each. There are also a number of superior courts, each with one judge. Superior courts may be organized in any city having more than 4,000 inhabitants.

HISTORY. Joliet and Marquette in their famous voyage down the Mississippi, in 1673, were the first white men to enter the present state of Iowa. Father Hennepin entered the state in 1680 but made no attempt at exploration. For more than a century the region was not again disturbed by white men but in 1788 Julien Dubuque, a French-Canadian, built a fort and trading post upon the present site of the city which bears his name. In 1803 the entire region became the property of the United States under the Louisiana Purchase, (which see) and formed a part of the Territory of Louisiana. In 1812 Iowa became a part of the territory of Missouri, and when Missouri became a state in 1821 Iowa formed a part of the territory of Michigan and Wisconsin. In 1838 it was organized as an independent territory. During these years settlers had entered the state and by 1840 the population had increased to 43,000. Several attempts were made to have the territory admitted as a state but disputes over boundaries caused considerable delay. Finally Iowa was admitted to the Union in December 1846 with its present boundaries. In 1857 the present constitution was adopted, the capital was removed from Burlington to Des Moines and an Indian massacre occurred at Spirit Lake in the northwestern part of the state. Since the close of the Civil War the history of Iowa has been one of constant progress and prosperity. Nearly 100,100 from Iowa served in the army, navy and marine corps during the World War, and during the period approximately $509,000,000 was subscribed to Liberty and Victory bonds.

STATISTICS. The following are the latest reliable statistics available:

Land area, square miles	55,586
Water area, square miles	561
Forest area, acres	2,500,000
Population (1920)	2,404,021
White	2,385,016
Negro	19,005
Chief Cities:	
Des Moines	126,468
Sioux City	71,227
Davenport	56,727
Cedar Rapids	45,566
Dubuque	39,141
Waterloo	36,230
Council Bluffs	36,162
Clinton	24,151
Burlington	24,057
Number of counties	99
Members of state senate	50
Members of house of representatives	108

Salary of governor	$5,000
Representatives in Congress	13
Assessed valuation of property	$4,059,614,588
Bonded indebtedness	None
Improved land, acres	28,606,951
Corn, bushels	444,190,000
Wheat, bushels	10,102,000
Barley, bushels	3,901,000
Oats, bushels	154,960,000
Rye, bushels	515,000
Flax seed, bushels	96,000
Potatoes, bushels	4,128,000
Hay, tons	4,659,000
Dairy products	$ 49,201,924
Wool clip, pounds	4,908,000
Domestic Animals:	
Horses	1,278,000
Mules	71,000
Milk cows	1,093,000
Other cattle	3,134,000
Sheep	948,000
Swine	7,546,000
Manufacturing establishments	5,683
Capital invested	$403,205,513
Operatives	80,551
Raw material used	$520,240,807
Output of manufactures	$745,472,697
Buttons	$ 4,794,422
Foundry and shop products	$ 40,632,692
Coal, short tons	8,187,500
Output of meat products	$221,692,868
Miles of railway	9,807
Teachers in public schools	25,827
Pupils enrolled	543,430

Iowa City, Ia., the county seat of Johnson County, is situated on the Iowa River, 54 miles northwest of Davenport. It is served by three railroads. The city is built on a succession of plateaus that rise above the river to an elevation of about 150 feet, on the uppermost of which stands the beautiful marble edifice once intended for the state capital. After the removal of the seat of government to Des Moines, in 1857, this building was appropriated to the State University, and is now used as the administration building by that institution. Important Iowa City manufactures are perfume, bricks, tiles, soap, gloves and mittens, knit goods, chairs, jewelry and agricultural implements. It is the seat of the State Historical Society and has the Ranney Memorial and Carnegie libraries. It has fine high schools and modern graded schools. Population, in 1920, 11,267.

Ipecac, ĭp-ē-kăk, the dried root of a South American shrub. The shrub belongs to the cinchona family. The plant grows wild, chiefly in the damp, shady woods of Brazil. Prepared from the bark of the root, ipecac is a white powder and is a standard remedy. It is a prompt emetic and is the chief constituent of Dover's powder.

Iphigenia, ĭf-ĭ-jë-nī′a, in Greek legend, the daughter of Agamemnon and Clytemnestra. When the Greek army assembled at Aulis to set sail for Troy, Agamemnon, so runs the legend, was unlucky enough to kill a stag sacred to Artemis (Diana). The soothsayer Calchas made an announcement that the offense could be appeased only by the sacrifice of Agamemnon's daughter. Agamemnon was plunged in grief, but sent for his daughter on the pretence of marrying her to Achilles. When the virgin was placed on the altar Artemis snatched her away and substituted a hind in her place. The maiden was wrapped in a cloud and conveyed to Tauris, where she became a priestess in the temple of Artemis. See Orestes.

Iranians, the natives of Iran, a name given by the ancient Persians to their country and which is still officially used. The territory embraced is much greater than the present limits of Persia, extending from the Tigris to the Indus and from the Persian Gulf to the Caspian Sea and the Oxus River.

The various intermixtures of Indian, Turanian, and Semitic make it difficult to place the Iranian ethnologically. Included under the general term are the Persians, Kurds, Bactrians, Afghans, Baluchis, and certain nomads of the Pamir plateau. In the main they are tillers of the soil or cattle raisers, though tradesmen and artisans are found in the towns.

Irawadi, ē-rä-wä′dĭ, the great river of eastern India. It rises in the eastern Himalayas, takes in general a southern course, and empties into the eastern end of the Bay of Bengal. It is navigable for small boats several hundred miles into the confines of China. Its upper course is swift and turbulent. The channel has in several places cut a narrow passage through the mountains. Mandalay, the capital of Burma, is situated at the lowest of these. It is really at the head of deep water navigation. The river has built new land extending for a distance of 140 miles into the

Indian Bay of Bengal. There are several mouths. Rangun, the commercial metropolis of this section, one of the great cities of India, is situated on the eastern outlet. The lower portion of the Irawadi resembles the Nile and the Ganges in sluggishness of current and volume of water. The flood plain is enriched by annual overflow, and is one of the great fertile regions of the world. See INDIA; GANGES.

Ireland, John (1838-1919), an American Roman Catholic prelate, born at Burnchurch, Ireland. While he was still a little boy he came to this country with his parents, who settled in St. Paul, Minnesota. After attending the Cathedral school in that city, he was sent to France and trained there for the priesthood, returning to Minnesota for his ordination which took place in 1861. During the early part of the Civil War he was chaplain of the Fifth Minnesota. Later he was made rector of the cathedral at St. Paul, and becoming interested in the temperance question, spent much time in lecturing and in organizing temperance societies. In 1875 he became coadjutor to Bishop Grace of St. Paul. He was active in planning for the Catholic University at Washington, accompanying Bishop Keane to Rome to consult with Pope Leo XIII in regard to it. On his return, in 1888, he was made first archbishop of St. Paul. He has been interested in advancing Roman Catholic colonization in the Northwest and in many other movements for the bettering of conditions in his diocese. Through his influence, there is being built in St. Paul a magnificent cathedral, and in Minneapolis a pro-cathedral quite comparable with it. Archbishop Ireland was distinguished as a lecturer and as a pulpit orator, and has published many articles in various periodicals on pertinent questions of the day.

Ireland, the second in size of the British Isles. It lies west of Great Britain, from which it is separated by the Irish Sea. The northeast point is but thirteen and one-half miles distant from Scotland. The southeast coast is separated from England by St. George's Channel, forty-seven miles in width at its narrowest point. The greatest length of Ireland is 306 miles; its greatest width 182. The area is 32,583 square miles, a little larger than Maine. Geographers say that the coast has been drowned. that is to say, that it has sunk slowly. The mouths of the rivers are now deep estuaries. There are thirty excellent harbors, fourteen of which are deep enough for the largest seagoing vessels. The island is divided into four provinces, Leinster, Munster, Ulster, and Connaught. These are subdivided into thirty-two counties. Of these Limerick, Tipperary, Cork, and Kilkenny are names famous in literature and history. Kerry, Clare, Galway, Sligo, and Tyrone are hardly less so. Much of the coast is rough. There are numerous low mountain peaks having a height of from 2,000 to 3,000 feet. The interior is an undulating plain from 200 to 500 feet high. Rainfall is abundant and quite evenly distributed. It is not so great as in the Highlands of Scotland, but more abundant than in eastern England. The average fall is from thirty-four to forty-four inches. The rivers are therefore larger than might be expected from the area of the island. The Shannon and the Liffey are the principal streams. There are numerous beautiful lakes. The most noted are the Lakes of Killarney in County Kerry. Lake Erne in the interior has a total length of forty miles.

MINERALS. The rocks of Ireland are chiefly granite, limestone, and basalt. The overlying coal-bearing measures that extend over so great a part of England and the Lowlands of Scotland have been ground off by former glacial action and carried out to sea. There are a few limited coal beds, however. There is an abundance of iron of excellent quality, but there is lack of coal with which to work it. There is a little silver, some lead, and more copper, but, generally speaking, Ireland is not rich in mineral wealth.

PEAT. From one-seventh to one-fifth of the island is covered with deposits of peat, the formation of which is assisted by the mists which wrap Ireland a large part of the year. In the low lands this peat is from ten to forty feet in depth. The largest peat bed is the bog of Allen. It is described as a dreary waste of red iron-stained morass, the monotony of which is relieved here and there by a turf hovel. In the mountain valleys and on the slopes the

peat formations are perhaps a foot in thickness. The deeper deposits contain many interesting remains kept by the preservative quality of peat, such as logs of oak, fir, animal and human skeletons, coins, old trees, canoes, etc. The surface of Ireland was at one time covered largely with forests. The deep peat beds show that they occupy the former site of oak forests, which were, in turn, succeeded by forests of fir. Ireland now lacks timber.

ANIMALS. The wolf hound, formerly bred for the chase, is one of the largest and finest breeds of dogs known. The wolf, fox, and stag were formerly known. The ancient Irish elk was far larger than a moose. At present there are few wild mammals except rodents. There are neither snakes nor toads. Bird lovers count up 120 species of land and water birds. Fish of excellent quality, including the salmon, are to be found in the lakes, streams, and estuaries.

SOIL AND CLIMATE. The temperature of Ireland is very even throughout the year. In winter, it seldom falls below 40°. In summer the heat seldom rises above 62°. The soil is rich. Certain regions are said to have the best soil found in the British Isles. All the common cereals and vegetables are cultivated. The harvest is not infrequently ruined, however, by prolonged summer rains. The principal field crops named in order of importance are oats, potatoes, turnips, barley, wheat, beans, and peas. The country is especially adapted to grass. A moist climate and rich soil produce the finest pasturage in the world.

MANUFACTURES. The chief cities of Ireland are Dublin, Belfast, Cork, Limerick, Londonderry, and Waterford. Ireland was celebrated at an early day for its commerce. Irish flax is of excellent quality. Belfast is the greatest linen center in the world. Cotton manufacturing has diminished. Irish lace has a high reputation. The art of making lace has been taught in convent schools. It has now declined. Silk weaving was introduced by French Huguenots after the revocation of the Edict of Nantes. Ireland vies with Scotland in the production and consumption of whisky. The peasants of Ireland, like the mountaineers of Tennessee, have been famous for the maintenance of small stills in secret places with the purpose of escaping the government tax on whisky. In 1685 between 2,000 and 3,000 stills were seized and destroyed. Even as late as 1880 the excise officers destroyed 685. The commerce of Ireland is treated in the articles on the various cities. A considerable network of canals covers a part of Ireland. They were formerly used for the transportation of passengers, but since the introduction of railways have been used for freight only.

POPULATION. The population of Ireland was reported in 1901 at 4,458,775. Of these 3,310,028 were Catholic, 579,385 Episcopal, and 443,494 Presbyterian. The Catholic population represents, approximately, at least, the original Irish population. The others are largely English and Scotch intruders, the English in the vicinity of Dublin, the Scotch in the vicinity of Londonderry. The genuine Irish belong to the same race as the Britons, Manx, Cornishmen, Welsh, and Highlanders of Scotland. The native language is Erse, akin to Gaelic. Population, 1921, 4,390,219.

HISTORICAL. According to the most trustworthy accounts, a considerable civilization was developed in Ireland as early as 1000 B. C. This period of Irish history is so embellished with legends and traditions that fact is hardly distinguishable from fiction. An ancient parliament, or gathering of chiefs, met in Tara's Hall, famous in song. Christianity was introduced into the island in the fifth century, through the labors of St. Patrick and others. Monasteries were established; also religious communities of men and women, thought to bear a resemblance to the modern Shaker community. While England was still pagan, Ireland was a center of missionary effort. Colonies of Irish monks were established in Great Britain and in Germany. They were the determined opponents of Druidism in the eleventh century.

Historians have been wont to claim that Adrian IV, the only Englishman who ever sat in the papal chair, granted Ireland to Henry II of England. The statement rests on uncertain authority. About 1155, however, Henry gained the consent of the Irish clergy and invaded the island with 500

knights and an army of footmen. He occupied the level portions of the island, driving many tribes into the mountains. It is believed that Irish discord enabled the English to gain a footing. However that may be, English occupancy and misrule began together. The opposition of the O'Briens, O'Neills, O'Connors, O'Connells, and McCarthys was never wanting. For centuries the treatment accorded the Irish was little better than that shown the American Indians on this continent. At the time of the English Reformation an effort was made to induce the Irish Catholics to join the Episcopal church, but in vain. During the time of Cromwell an Irish uprising was put down with an iron hand. In a nine months' campaign, thousands of men were executed; 20,000 were sold into labor, little better than slavery, in the West Indies, and 40,000 Irishmen were driven from the island to enlist in the armies of various European countries. When later the Stuart family was driven from the throne of England the Irish stood by James II to the last. Their forces were dispersed at the battle of the Boyne, however, and English control of the island was complete.

We may look in vain for persecution more persistent than that experienced by the Irish in the seventeenth and eighteenth centuries. Their lands were confiscated. They were obliged to pay tithes for the support of an alien church. They were forbidden to send their children to their own schools if taught by Catholics. Those who were able to place their children in school in foreign countries did so. The children of the masses were untaught. Their manufactures were crippled by selfish legislation intended to benefit English industries. A large part of the island was held by absentee landlords who lived in England and who instructed their agents to extort the last penny of rent. If a peasant made improvements, his rent was raised; if he refused to pay, he was evicted. The picture often drawn of a hard-hearted agent driving away the family cow, leaving starving children to cry at the mother's knee, is by no means an exaggeration. The consequence was a miserable, shiftless, hand-to-mouth cultivation of the soil, with a degree of poverty and distress hardly possible in a country designed by nature to be a land of plenty.

It was difficult for the Irish to make themselves heard. A Catholic was not allowed to hold office. A semblance of resistance to British authority had always been maintained in the Irish Parliament. In 1801 the British authorities led by Pitt are said to have expended $8,000,000 in bribing enough members to induce the Irish Parliament to unite with that of Great Britain. From that time on, however, Irish prospects began to look up somewhat. About the middle of the nineteenth century, during Gladstone's administration, more humane ideas prevailed in Parliament. Many helpful measures were passed. In brief, the hand of the government has been removed from church affairs and public schools have been established.

In 1841 there were 8,000,000 people. There ought to be 11,000,000 at the present time, but famine, fever, and cholera carried away nearly 4,000,000; 3,754,899 emigrated to other countries during the latter half of the nineteenth century, the greater portion of them to the United States. The report for 1903 puts the population at 4,390,208, a mere third of what Ireland is capable of maintaining in comfort. The twelfth United States census shows that there are more Irish people in New York City alone than there are in the two chief cities of Ireland—Dublin and Belfast—taken together. In the United States there were, according to this census, 1,616,469 people who were born in Ireland, 4,001,461 children both of whose parents were Irish, and 979,586 with one native Irish parent. The total Irish population of the United States, including those with Irish grandparents and great grandparents, is nearly double that of the mother country today.

Ireland, land of the Erse, was known to the Romans as Hibernia. The Irish poet affectionately refers to it as Erin, and to him its rich store of legends is a source of never-failing delight. Some of these traditions and legends are poignantly beautiful. Modern Irish writers, among them are William Butler Yeats, Lady Gregory, John Millington Synge, G. W. Russell ("A.E."), and the lamented "Eithnea Carberry" (the wife of Seumas McManus),

have sung of Ireland's joys and sorrows with mellow humor and tender pathos. There are many cycles in Irish literature, and many are the writers who have drawn inspiration from Ireland's inexhaustible sagas.

Recent History. Centuries of agitation for Home Rule for Ireland—Ireland for the Irish—resulted in overt warfare, reprisals and general misery for the Irish. Agitation did not cease, however, despite the constant effort of the British to allay it, but continued until Ireland was finally granted the status of a Free State with a degree of autonomy similar to that enjoyed by the Dominion of Canada. See Irish Free State.

Statistics. The following are the latest statistics to be had from trustworthy sources:

Land area, square miles	32,586
Forest area, acres	289,944
Population (1911)	4,390,219
Chief Cities:	
Dublin	403,030
Belfast	393,000
Cork	76,673
Londonderry	40,780
Limerick	38,515
Waterford	27,430
Number of counties	38
Peers in House of Lords	28
Representatives in House of Commons	108
Permanent pasture area, acres	9,122,000
Farm area, acres	5,271,000
Potatoes, bushels	74,140,000
Oats, bushels	65,388,000
Barley, bushels	7,527,000
Cabbage, tons	317,819
Turnips, tons	4,107,462
Wheat, bushels	1,403,000
Rye, bushels	136,000
Mangels, tons	1,245,507
Flax, tons yearly	10,000
Domestic Animals:	
Horses	555,000
Mules and asses	257,000
Cattle	5,197,000
Sheep	3,708,000
Goats	261,000
Swine	977,000
Imports	$1,000,000
Exports	$1,000,000
Ships built, tons	222,955
Fish catch, tons	20,421
Miles of railway	3,409
Number of schools	8,002
Pupils enrolled	688,955

Ireland, William Henry, (1777-1835), an English writer. His father took him on a trip to Stratford-upon-Avon to visit the birthplace of Shakespeare. The young man forged a lease, purporting to be signed by Shakespeare, which he claimed to have found in a lot of old papers. He afterward wrote a play called *Vortigern,* palming it off as a recently discovered play by Shakespeare. The renowned actor, Kemble, put it on the stage before the fraud was detected. This play and a *Henry II,* another forgery, were published in 1799. See Shakespeare.

Iridium, ĭ-rĭd′ĭ-ŭm, a metallic element much like platinum. It was identified in 1802. With the exception of osmium, also a newly discovered metal, it is the heaviest substance known. It is very difficult to melt, requiring a temperature of at least 3600° F. It is insoluble in acid and does not rust. It is used frequently for the tips of gold and stylographic pens. Also in the construction of electric instruments, as the resistance coil. Small quantities are obtained in California, Borneo, Brazil, and in the Ural Mountains. It forms three oxides. The solutions made from the salts of the metal take on various tints; hence the name, from *Iris,* the rainbow.

Iris, ī′ris, in Greek mythology, the goddess of the rainbow. She was the daughter of Thaumas and Electra, and a sister of the Harpies. She lived among the gods on Olympus, but was sent often to bear the messages of the gods to mankind. As Mercury was the special messenger of Zeus, so Iris was of Hera. The ancients believed that it was Iris who caused the clouds to become filled with water to be discharged in rain upon the thirsty earth. Iris is represented in art as a golden winged virgin clad in variegated hues and riding on a rainbow or with a rainbow above her head.

Iris. See Flag.

Irish Famine, a calamitous scarcity of food that overtook Ireland in 1846. The population of Ireland at the beginning of the year was about 8,000,000. The rural population was dependent largely upon the potato crop for food. Sodden weather brought a blight upon the potato fields in the autumn of 1845 and again in 1846. An appeal for help in food for starving Ireland went out and all Christendom responded. Ship after ship was dispatched from the American shores. Parliament

voted sum after sum, but such were the delays of transportation and of distribution in those days that 2,000,000 men, women, and children died before food could reach them. Many thousands, especially the young and vigorous, tramped to seaports and got away. A million emigrants left Ireland for New York during the next four years—the beginning of the great Irish immigration to America. See FAMINE.

Irish Free State. After centuries of warfare and friction between England and Ireland, a treaty was signed in London on December 6, 1921, by the British and Irish delegations which has come nearer settling the controversy of home rule for Ireland than any measure previously taken. By the terms of the treaty Ireland becomes the Irish Free State, with the same relation to the British Empire as have Canada, Australia and South Africa. This treaty was enthusiastically received by the press of Great Britain, the United States and the European countries. A special session of the British Parliament was called, to meet on December 14, for the purpose of ratifying the treaty.

THE TREATY

Article 1. Ireland shall have the same constitutional status in the community of nations known as the British empire, as the Dominion of Canada, the Commonwealth of Australia, the Dominion of New Zealand and the Union of South Africa, with a parliament having powers to make laws for peace and order and good government in Ireland, and an executive responsible to that parliament, and shall be styled and known as the Irish Free State.

Article 2. Subject to provisions hereinafter set out, the position of the Irish Free State in relation to the imperial parliament, the government, and otherwise, shall be that of the Dominion of Canada; and the law, practice and constitutional usage governing the relationship of the crown or representative of the crown and the imperial parliament to the Dominion of Canada shall govern their relationship to the Irish Free State.

Article 3. A representative of the crown in Ireland shall be appointed in like manner as the governor general of Canada and in accordance with the practice observed in making such appointments.

Article 4. The oath to be taken by the members of the parliament of the Irish Free State shall be in the following form:

"I do solemnly swear true faith and allegiance to the constitution of the Irish Free State as by law established, and that I will be faithful to his majesty King George V and his heirs and successors by law, in virtue of the common citizenship of Ireland with Great Britain and her adherence to and membership of the group of nations forming the British commonwealth of nations."

Article 5. The Irish Free State shall assume liability for service of the public debt of the United Kingdom as existing at the date thereof and toward the payment of war pensions as existing on that date in such proportions as may be fair and equitable, having regard for any just claims on the part of Ireland by way of setoff or counter claim, the amount of such sums being determined, in default of agreement, by the arbitration of one or more independent persons being citizens of the British Empire.

Article 6. Until an arrangement has been made between the British and Irish governments whereby the Irish Free State undertakes her own coast defense, defense by sea of Great Britain and Ireland shall be undertaken by His Majesty's imperial forces, but this shall not prevent the construction or maintenance by the government of the Irish Free State of such vessels as are necessary for the protection of the revenue or the fisheries. The foregoing provisions of this article shall be reviewed at a conference of representatives of British and Irish governments to be held at the expiration of five years from the date hereof with a view to the undertaking by Ireland of a share in her own coastal defense.

Article 7. The government of the Irish Free State shall afford to His Majesty's imperial forces (a) in time of peace such harbor and other facilities as are indicated in the annex hereto, or such other facilities as may from time to time be agreed between the British government and the government of the Irish Free State, and (b) in time of war or strained relations with a foreign power such harbor and other facilities as the British government may require for the purpose of such defense, as aforesaid.

Article 8. With a view to securing observance of the principle of international limitation of armaments, if the government of the Irish Free State establishes and maintains a military defense force the establishment thereof shall not exceed in its size such proportion of the military establishments maintained in Great Britain as that which the population of Ireland bears to the population of Great Britain.

Article 9. The ports of Great Britain and the Irish Free State shall be freely open to the ships of the other country on the payment of the customary port and other dues.

Article 10. The government of the Irish Free State agrees to pay fair compensation, on terms not less favorable than those accorded by the act of 1920, to judges, officials, members of police forces, and others who are discharged by it or who retire in consequence of the change of government affected in pursuance of the hereof paragraph:

Provided that this agreement shall not apply to members of the auxiliary police force or persons recruited in Great Britain for the Royal Irish Constabulary during the two years next preceding the date hereof. The British government will assume responsibility for such compensation or pensions as may be payable to any of these excepted persons.

Article 11. Until the expiration of one month from the passing of the act of Parliament for the ratification of this instrument the powers of the parliament and government of the Irish Free State shall not be exercisable as respects northern Ireland, and the provisions of the government of Ireland act of 1920 shall so far as they relate to northern Ireland remain of full force and effect and no election shall be held for the return of the members to serve in the Parliament of the Irish Free State for the constituencies of northern Ireland unless a resolution is passed by both houses of Parliament of northern Ireland in favor of holding such elections before the end of said month.

Article 12. If before the expirations of said month an address is presented to His Majesty by both houses of Parliament of northern Ireland to that effect, the powers of the Parliament and government of the Irish Free State shall no longer extend to northern Ireland and the provisions of the government of Ireland act of 1920 (including those relating to the council of Ireland) shall, so far as they relate to northern Ireland, continue to be of full force and effect, and this instrument shall have effect, subject to the necessary modifications;

Provided, that if such an address is so presented, a commission consisting of three persons, one to be appointed by the government of the Irish Free State, one to be appointed by the government of northern Ireland, and one, who shall be chairman, to be appointed by the British government, shall determine, in accordance with the wishes of the inhabitants, so far as may be compatible with economic and geographic conditions, the boundaries between northern Ireland and the rest of Ireland, and for the purposes of the government of Ireland act of 1920 and of this instrument the boundary of northern Ireland shall be such as may be determined by such commission.

Article 13. For the purpose of the last foregoing article the powers of the parliament of southern Ireland under the government of Ireland act of 1920, to elect members of the council of Ireland, shall after the parliament of the Irish Free State is constituted be exercised by that parliament.

Article 14. After the expiration of said month, if no such address as mentioned in Article 12 hereof is presented, the parliament of the government of northern Ireland shall continue to exercise as respects northern Ireland the powers conferred upon them by the government of Ireland act of 1920, but the parliament of the government of the Irish Free State shall in northern Ireland have in relation to matters, in respect of which the parliament of northen Ireland has not the power to make laws under that act (including matters which, under said act, are within the jurisdiction of the council of Ireland), the same powers as in the rest of Ireland, subject to such other provisions as may be agreed to in the matter hereinafter appearing.

Article 15. At any time after the date hereof the government of northern Ireland and the provisional government of southern Ireland, hereinafter constituted, may meet for the purpose of discussing provisions, subject to which the last of the foregoing articles is to operate in the event of no such address as is therein mentioned being presented, and these provisions may include: (a) safeguards with regard to patronage in northern Ireland; (b) safeguards with regard to the collection of revenue in northern Ireland; (c) safeguards with regard to import and export duties affecting the trade and industry of northern Ireland; (d) safeguards for the minorities in northern Ireland; (e) settlement of financial relations between northern Ireland and the Irish Free State; (f) establishment and powers of a local militia in northern Ireland and the relation of the defense forces of the Irish Free State and of northern Ireland, respectively, and if at any such meeting provisions are agreed to, which the powers of parliament and of the government of the Irish Free State are to be exercisable in northern Ireland under Article 14 hereof.

Article 16. Neither the parliament of the Irish Free State nor the parliament of northern Ireland shall make any law so as either directly or indirectly to endow any religion or prohibit or restrict the free exercise thereof, or give any preference or impose any disability on the account of religious belief or religious status, or affect prejudicially the right of any child to attend school, receiving public money without attending the religious instruction of the school, or make any discrimination as respects state aid between schools under the management of the different religious denominations or divert from any religious denomination or any educational institution any of its property, except for public utility purposes and on the payment of compensation.

Article 17. By way of provisional arrangement for the administration of southern Ireland, during the interval which must elapse between the date hereof and the constitution of a parliament and a government of the Irish Free State in accordance therewith, steps shall be taken forthwith for summoning a meeting of the members of parliament elected for constituencies in southern Ireland since the passing of the government of Ireland act in 1920 and for constituting a provisional government. And the British government shall take steps necessary to transfer to such provisional government the powers and machinery requisite for the discharge of its duties, provided that every mem-

ber of such provisional government shall have signified in writing his or her acceptance of the instrument. But this arrangement shall not continue in force beyond the expiration of twelve months from the date hereof.

Article 18. This instrument shall be submitted forthwith by His Majesty's government for the approval of parliament and by the Irish signatories to a meeting summoned for the purpose of members elected to sit in the House of Commons of southern Ireland and if approved it shall be ratified by the necessary legislation.
Signed:

On behalf of the British delegation:
Lloyd George.
Austen Chamberlain.
Birkenhead.
Winston Churchill.
Worthington Evans.
Hamar Greenwood.
Gordon Hewart.

On behalf of the Irish delegation:
Art of Griobhtha (Arthur Griffith).
Michael O. O. Sileain (Michael Collins).
Riobard Bartun (Robert C. Barton).
E. S. Dugan (Eamon J. Duggan).
Seorsa Ghabgain Ui Dhubhthaigh (George Gavan Duffy).

Dated the 6th of December, 1921.

RATIFICATION. The treaty was scathingly denounced in the House of Lords by Lord Carson, the Ulster leader. Eamon de Valera, "President of the Irish Republic," was the first to raise opposition to the treaty in Ireland. He intimated that the Irish delegates had exceeded their authority in signing the document.

The Dail Eireann was assembled on December 14, and deliberated in secret sessions for three days. The first public discussion of the treaty was held on December 19, which showed that there was a division over the treaty, de Valera leading the faction opposed to it and Arthur Griffith the faction in favor of it.

Meantime the Ulster Cabinet sent a letter to Premier Lloyd George, rejecting the invitation to enter the Irish Free State. The chief point in controversy between de Valera and Griffith was the Irish Republic, which de Valera claimed had been established as a free and independent nation. He asserted that to accept the Irish Free State as a state in the British Commonwealth of Nations was to give up everything that had been gained, and he offered a substitute constitution for that provided in the treaty. On December 23, before this discussion was closed, the Dail Eireann adjourned until January 3, 1922.

Notwithstanding these obstacles to the ready adoption of the treaty, the British Government in good faith released nearly all of the prisoners in Ireland, held for political purposes, and immediately began the withdrawal of British troops. When the Dail Eireann reassembled on January 3, it resumed the discussion of the treaty, and on January 7, 1922, ratification of the treaty with England was voted by 64 to 57. On January 9, de Valera resigned the presidency of the Irish Republic, but permitted himself to be offered for reelection. He was defeated by a vote of 60 to 58. On the following day Arthur Griffith was unanimously elected by 64 deputies of the Dail Eireann, de Valera and his followers having left the Chamber.

The following day Mr. Griffith presented his Cabinet:

Michael Collins—Minister of Finance.
George Gavin Duffy—Foreign Affairs.
Eamon J. Duggan—Home Affairs.
William T. Cosgrave—Local Government.
Kavin O'Higgins—Economic Affairs.
Richard Mulcahy—Defense.

On January 14, a Provisional Government was established for the Irish Free State, this government to control affairs until the first general election. On January 16, Michael Collins took over Dublin Castle and received from Viscount Fitz Alan, Lord Lieutenant of Ireland, the formal transfer of the offices.

DISSENSIONS. Mayoralty elections, which occurred January 20, placed opponents of the treaty in office in Dublin, Cork, Limerick and some other cities, and seated a Nationalist for Derry. The boycott which had existed against Ulster was called off by the Dail Eireann Cabinet on January 24, as a result of a conference between Michael Collins and Sir James Craig. The Irish Race Congress, sitting in Paris on January 27, elected Eamon de Valera President, and decided to open an office in Dublin for the Central Committee.

A deadlock occurred on February 2, between Sir James Craig, the Ulster Premier and Michael Collins, in an attempt to settle the boundary question between Ulster

and Irish Free State. It developed, however, that questions of more far-reaching importance were considered at this conference.

Sir James Craig and the leaders of the Provisional Government were summoned to London, where it was soon discovered that there was a new crisis in Irish affairs.

On February 8, portions of Ulster were subject to raiding by Irish Republican bands, police were attacked, bridges blown up and numerous casualties resulted. Notwithstanding the efforts of the leaders of the Provisional Government and of the British Ministry to pacify the contending parties, the outbreaks continued. Each party claimed that the other was attempting to encroach on its territory.

The trouble continued, increasing somewhat in intensity until March 30, when an agreement was signed between representatives from the Irish Free State and the Northern Government, providing a stay of hostilities. It was hoped that this agreement would lead to a union of the Ulster Government and the Free State. The main points of the agreement are as follows:

1. Peace is declared, the two Irish governments agreeing to cooperate to restore order in the unsettled areas.
2. The police of Belfast in mixed districts are to be composed half of Catholics and half of Protestants, and all police, except the secret service men, are to be uniformed and numbered.
3. A court of which the Lord Chief Justice will be a member, is to be constituted for the trial, without jury, of persons charged with serious crimes, such as those punishable by death, penal servitude or imprisonment exceeding six months.
4. A committee consisting of equal numbers of Catholics and Protestants, and with an independent chairman, is to be established in Belfast to hear and investigate complaints of outrages and intimidation.
5. Irish "Republican" Army activities in Ulster are to cease and a special police organization is to take the place of the Army.
6. The British Government is to ask Parliament for a relief fund not exceeding 500,000 pounds for northern Ireland, one-third to be expended for the benefits of Catholics, and two-thirds for Protestants. The Ulster Government agrees to use every effort to reinstate expelled workmen in their former positions.
7. The two Irish governments can, in cases agreed upon, arrange for the release of political prisoners imprisoned for offences committed before March 31, 1922.
8. The two governments agreed to unite in appealing to all concerned to refrain from inflammatory speeches and to exercise restraint in the interests of peace.

This truce, however, was of short duration. Actual civil war prevailed in the Irish Free State during April. The factional controversy between de Valera and the Free State leaders, Michael Collins and Arthur Griffith, swelled the political tumult. The most hopeful phase of the situation was the attitude of the people as a whole, who insistently demanded peace and finally succeeded in bringing about a cessation of armed hostilities among the rival factions. On April 23, Irish labor made effective a one-day strike against the prevailing militarism.

Just before the meeting of the Dail Eireann, the Catholic bishops issued a statement strongly denouncing military terrorism. On May 1, six generals of the Irish Republican Army insurgents joined with commanders of the regular forces in an appeal for army unity on the basis of the treaty. Following this appeal, on motion of de Valera, the Dail Eireann adopted a resolution ordering opposing sides in the Irish Republican Army to cease firing immediately, and at the same time appointing a peace committee. A truce was extended to May 10, and again extended until the general election.

But hostilities did not entirely cease. In and around Belfast there were a number of serious outbreaks and the British Government was finally under the necessity of sending troops to quell the disturbance. In the June election the treaty was approved. A provisional government was created immediately and seriously set about to restore order in this unfortunate country. A fair amount of success attended the effort, though sporadic uprisings occurred in the north.

Finally, at the end of 1922, a regularly constituted government, with Timothy Healy at its head as Governor General of the Irish Free State, took charge of Irish affairs. William T. Cosgrave was chosen president of the cabinet. He chose the following men, to constitute, with himself, the Executive Council of the Free State.

Kevin O'Higgins—Minister of Home Affairs.
Richard Mulcahy—Minister of Defense.
Ernest Blythe—Minister of Local Government.
Joseph McGrath—Minister of Industry, Commerce and Labor.
Desmond Fitzgerald—Minister of Foreign Affairs.

Irish Melodies. See MOORE, THOMAS.

Irish Moss, a seaweed found most abundantly on the rocky coast of Ireland near Waterford. The stem, called a frond, is thick and branching in the shape of a fan. In color it varies from purple to green. It is gathered, dried in the sun, and sold to the grocers. When placed in hot water it swells up and dissolves; on cooling it congeals and makes a nutritious, inexpensive substitute for jelly and starch in the preparation of various soups and table delicacies, and is used medicinally by the peasants of Ireland. It is also called "carrageen," from Carragheen, Ireland. In Hawaii some species are called "limus." It also grows in Japan.

Iron, ī'ŭrn, a hard, heavy, well known metal. Pure iron is silvery-white in color, but it is seldom seen. Wrought iron is the purest commercial form; yet piano strings, the purest wrought iron in the market, contain three pounds to the thousand of carbon and other elements. When in the presence of a magnet, or when placed within a coil through which an electric current is passing, soft iron becomes magnetic. Iron remains unchanged in dry air, but rusts —unites with oxygen—in moist air.

Iron is the most useful of all metals, and of all metals it is the most widely distributed in nature. It forms a twentieth part of the world's crust. It is essential to life of all sorts. It is found in the green chlorophyll of plants and in the blood of animals. It occurs in meteorites. The color spectrum shows that iron is present in the sun. There is an iron mountain near Durango, Mexico. It is a projecting backbone or dike of solid iron ore,—a huge mass one mile long, a third of a mile wide, and 450 to 650 feet high. Similar hills in Missouri are known as Iron Mountain and Pilot Knob.

Although the world is rich in deposits of iron the supply is by no means inexhaustible. In response to an inquiry instituted in 1905 by the Swedish government as to the world's supply of iron, experts submitted the following report. The figures represent tons of iron ore.

Country	Workable deposits	Annual output
United States.....	1,100,000,000	35,000,000
Great Britain	1,000,000,000	14,000,000
Germany	2,200,000,000	21,000,000
Spain	500,000,000	8,000,000
Russia and Finland..	1,500,000,000	4,000,000
France	1,500,000,000	6,000,000
Sweden	1,000,000,000	4,000,000
Austria-Hungary ...	1,200,000,000	3,000,000
Other countries	.....	5,000,000
Total	10,000,000,000	100,000,000

In this estimate great possibilities have no doubt been overlooked. Enormous deposits in the Rocky Mountains, in Mexico, in the Andes, in Africa, and doubtless in the Himalayas, are not taken into account, but the fact that the known supply will last only 100 years at the present rate of consumption is enough to make the reader thoughtful.

The American colonists brought articles or iron with them and for a time the smiths imported bar iron. Iron furnaces were set up at an early day, however. Mordecai Lincoln, an ancestor of Abraham Lincoln, established a small furnace at Scituate, Massachusetts. The father of George Washington had a furnace in Virginia. The iron ores of New Jersey have played an important part in the development of the country, but have been neglected of late for ores more easily mined. The region about Pittsburgh, Pennsylvania, furnished a large part of the iron consumed in building early American railroads, but iron ore is so abundant and cheap that only the most accessible mines are worked. Of late the material for heavy rails, locomotives, iron bridges, and sky-scrapers has been obtained chiefly from the Alabama and Lake Superior regions.

In the production of iron ore the states of the Union rank as follows: Minnesota, Alabama, Michigan, Pennsylvania, New York, and the Virginias. The sudden advance of Minnesota in iron production is due in part to the remarkable cheapness with which iron in the form of gravel may be obtained in a number of mines northwest of Lake Superior. Much of this gravel lies in hills or open pits accessible by a train

BURT POOLE IRON MINE, Mesaba Range, Minnesota

CASTING PIG IRON—Iroquois Smelter, Chicago

of ore cars into which the ore is loaded by steam shovels. Ten shovelfuls load fifty tons into a hopper-bottomed steel car in three minutes. Trains of enormous length descend an easy grade, fifty or 100 miles to Lake Superior, where they run out on elevated ore docks, from the bins of which lake-going boats are loaded for Cleveland and other lake points. The largest ore ship now carries as high as 12,000 tons at a cargo. Ordinarily, iron so far from coal lies undisturbed; but in this case the low cost of mining and transportation proves more than an offset.

Next to the United States comes Great Britain as a producer of iron. An abundance of coal is a factor. The ores of Norway and Sweden are celebrated. Germany ranks third in quantity. Spain has a high record for quality and quantity. Italy and Portugal lack coal with which to develop their large deposits. Newfoundland ships iron ore to Glasgow. Africa, Algeria, and Cuba export iron. Australia and South America have the ore, but as yet depend largely on outside countries for their supply of iron.

Iron ores, however obtained, are first roasted to drive out water and sulphur, and the ore is then reduced in blast furnaces. These are huge fireproof chimneys, twenty-five to ninety feet high. They are filled by dumping in at the top, first a layer of coke, then a layer of iron ore, mixed perhaps with limestone, then coke and iron again, layer after layer, until the furnace is ready to fire. An intense heat melts the iron which sinks in a pool at the bottom of the furnace. When ready, a plug is knocked out and a flood of molten iron pours out into a system of furrows, made ready in a level yard of sand, perhaps an acre in extent. Men wearing wooden shoes work like demons in the heat, seeing first that the iron runs unobstructed and fills the gridiron ditches. As soon as the iron has solidified, and before it hardens, the workmen swing huge sledges and break the still white-hot streams of metal off into pieces not unlike cordwood in length. A supply ditch is called a sow. Many short ditches run out at right angles from the sows and are called pigs, terms suggested doubtless by the appearance of a brood sow suckling a lot of young pigs. The pieces into which the sows and pigs are broken are the pig iron of commerce. Steel, wrought iron, cast iron, malleable iron—iron in whatever form it may enter the endless list of articles made from this metal—are made from pig iron.

In modern smelting works the casting machine has taken the place of the sand bed for casting pig iron. The iron is poured directly into molds which are attached to an endless chain, by which they are carried through water to cool the iron. As the molds emerge from the water they automatically empty the cooled iron onto a truck. Only a small portion is made into pig iron, since it is much less expensive to manufacture wrought iron and steel directly from the "first heat", as the molten iron is called by the workmen. Iron designed for these purposes is poured into large ladles and taken to other furnaces.

In large blast furnaces the process is continuous. The fires never cease to roar. As fast as the mass sinks, ore, limestone, and coke are poured in at the top. The largest have an inside capacity of twenty-five feet. Prehistoric man managed to cobble up a furnace with stones and clay. A modern blast furnace, with blowers to inject air, steam hoists, inclined railroad tracks, and other accessories, is worth several million dollars. A large furnace has a capacity of 600 tons of pig iron a day. Large and small, there are over 450 blast furnaces in the United States. In number of furnaces and the production of pig iron, Pennsylvania, Ohio, Illinois, and Alabama rank in the order named.

Pig iron, or cast iron, is too brittle and contains too many other elements to be welded. Wrought iron is obtained from pig iron by smelting in a puddling furnace in which the heat and flame of burning coal remove the foreign ingredients until only six pounds of carbon to the thousand, and slight traces of sulphur, phosphorus, silver and manganese are left. Wrought iron may be welded by being heated until it is soft and hammered until the surfaces are brought into actual contact. A sprinkling of borax in the joint helps to clear the surface of cinders and to produce perfect adhesion. Wrought iron fuses at 2000° C.

The chief iron ores are known as hematite and magnetite. Hematite is a compound of iron and oxygen in the proportion of two atoms of iron to three of oxygen. It is of two kinds, red and brown. Red hematite makes a red mark. It gives clay a red color. Bog iron is a form of brown hematite. It makes a brown mark. Magnetite is a harder, blacker, more crystalline ore. It contains more iron. The proportion of atoms is three of iron to four of oxygen. The most noted magnetite ore is the famous Swedish iron. Magnetite makes the finest cutlery. The ores of Alabama and the Superior region are chiefly hematites. Iron pyrites is a compound of iron and sulphur.

The production of iron ore in the United States in long tons was in 1919:

Alabama	4,895,309
California	2,053
Georgia	74,007
Michigan	12,911,727
Minnesota	34,547,356
Missouri	53,626
New Jersey	336,629
New Mexico	224,553
New York	701,668
North Carolina	58,778
Pennsylvania	616,271
Tennessee	282,988
Utah	44,185
Virginia	304,920
Wisconsin	881,740
All Other	435,337
Total	56,371,167

Before the Great War the production of pig iron by the different countries averaged about as follows:

United States	15,800,000
Germany	11,800,000
Great Britain	9,000,000
France	3,450,000
Russia	2,850,000
Belgium	1,350,000
Austria-Hungary	1,500,000
Sweden	500,000
Canada	600,000
Spain	400,000
Italy	135,000
Japan	38,000
Other countries	100,000
Total	47,523,000

The War stopped iron mining in Europe, but in 1919 the United Kingdom produced 12,706,895 metric tons and France 1,572,000 metric tons.

See STEEL; TEMPERING; NAIL.

COMPOUNDS OF IRON. In addition to the various iron ores, there are a number of compounds which iron forms with other substances. Iron forms three compounds with oxygen, known as iron oxides; the best known of these is iron rust. With sulphuric acid iron forms a sulphide, easily recognized by its yellowish-green crystals, and commonly known as green vitriol. It is used in dyeing, in the manufacture of sulphuric acid, as a disiinfectant, and for other purposes. Another compound with sulphur-iron pyrite—occurs in rocks, in the form of cubes, or in mass. It has a yellowish, metallic luster, and has often been mistaken for gold, for which reason it is sometimes referred to as "fool's gold." It is of little value in the arts.

Potassium ferrocyanide, or the yellow prussiate of potash, is extensively used in photography. It is a rank poison.

USES IN MEDICINE. Iron makes the blood red and the leaves of plants green. In some form iron is an ingredient in the systems of most animals and plants. A certain amount of iron in the human system is essential to health, for without this, one becomes anaemic.

Many medicinal preparations contain iron, and physicians often prescribe it in some form. Ferric chloride is the compound most frequently used, and it is generally administered in the form of a tincture, containing about three and one-fourth per cent of iron.

Because of their acidity compounds of ferric chloride are likely to produce a bad effect upon the stomach, and should be administered under the direction of a physician.

Iron compounds also constitute excellent local astringents for external applications. They are also well known remedies in cases of sore throat and tonsilitis. Some iron compounds have been used successfully in diphtheria.

Iron Age, The. See ARCHAEOLOGY; HESSID.

Iron Cross, the most coveted of German military decorations, is bestowed upon officers and men of the German army and navy for acts of unusual bravery. It is a simple decoration, in the shape of a Mal-

tese cross and made, as the name indicates, of iron; and there is a first and a second class cross, awarded according to the nature of the deed. The iron cross was instituted in 1813, by King Frederick William III of Prussia, and was at first given only to Prussians. But with its revival during the Franco-Prussian War, 1870, the iron cross was awarded to any German who was especially valorous. During the World War an astonishing number of these decorations was awarded, as it was the policy of the German high command to allow no act of superior courage to go unrewarded.

Iron Gate, in geography, a celebrated defile in the valley of the Danube. As the river passes southward out of Hungary it forces its way in a series of rapids through a narrow, rocky gorge, a mile and one-half in length. A canal has been constructed to enable vessels to pass through the Iron Gate. A railway also follows the water's edge. See DANUBE; BELGRADE.

Iron Mask, The Man with the, a mysterious state prisoner of France. He was confined in several prisons during the reign of Louis XIV. He always wore a mask of black velvet secured with springs of steel or iron. No one, not even his physician, was allowed to see his face. His name was never mentioned. In other respects he was treated with the greatest consideration. He was evidently a person of some education. He whiled away the time by reading and playing the guitar, and was given anything he desired except his freedom. He died in 1703 and was buried under the name of Marchiali. Everything which had been employed in his service was burned, and every precaution taken to keep the secret of his name from being discovered. Even the tiles in the room he had occupied were removed lest a letter might have been concealed behind them. Great curiosity was felt for many years as to his identity. The question was never settled positively, but the more commonly accepted view is that he was Count Matthioli, a minister of the Duke of Mantua, and that he was imprisoned for treachery. Another view is that he was implicated in a conspiracy against the king.

Ironsides, a name applied to the famous regiment led by Cromwell in the Civil War. The name was extended to the entire Puritan army. They were men of prayer and godly lives—chiefly yeoman farmers.

They prayed before battle and then charged with the old Hebrew battle psalms upon their lips.—W. M. West.

If ever there were men who laid down their lives in the cause of all mankind, it was those grim old Ironsides, whose watchwords were texts from Holy Writ, and whose battle-cries were hymns of praise—John Fiske.

Ironton, Ohio, a manufacturing city and the county seat of Lawrence County, is on the Ohio River, 100 miles southeast of Columbus, and on three railroads. The Chesapeake & Ohio Railroad, on the Kentucky side, maintains freight and passenger ferry service to Ironton. The city is in a region rich in iron ore, fire and pottery clay, and bituminous coal, and its chief manufactures are iron ware, boilers, stoves, fire bricks, nails, wire, cement, doors and furniture. It contains Kingsbury School, the Briggs Public Library, Masonic Temple and Elks building, churches, theaters, banks and good graded schools. The water works are the property of the city. Population, in 1920, 14,007.

Ironwood, Mich., an industrial city, situated in what is known as the Gogebic iron region. Here is mined the famous high grade Bessemer ore. It is on the Montreal River, and on two railroads. The name of the city derives from the principal industries—iron mining and lumbering. It contains planing mills, lumber mills, door and sash factory and boiler shops. It has a Carnegie library and good schools. A new million dollar junior and senior school is now being built. The population is about 18,000.

Iroquois. See INDIANS.

Irrigation, watering land by means of artificial streams and overflowing. Natural freshets, overflows, and spring floods are not included under the term. The surplus waters of the Nile have been caught in reservoirs and used for irrigation from time immemorial. Rollin's *Ancient History* gives an account of the rude contrivances used for elevating water into the ditches. The famed fertility of ancient Mesopotamia was due in part to the skillful use of

the waters of the Tigris and Euphrates for watering the plains. Smaller areas are yet made fertile by this method. India has 22,500,000 acres of irrigated land. China has maintained extensive irrigation systems since the dawn of history, especially in the rice districts. Portions of Spain, southern France, and the great plains of northern Italy, particularly the valley of the Po, are indebted to systematic irrigation.

For an account of tidewater irrigation, or the flooding of land, as practiced in the Atlantic rice-growing states, the reader is referred to the article on RICE. Irrigation is not a new art in America. When the Spaniards first visited Arizona and surrounding regions they found the remains of extensive irrigation systems in the valleys adjacent to the ruins of the cliff dwellers' ancient cities. Small portions of the old fields were still watered and tilled by their descendants, as is the case at the present day. The early Spanish settlements or missions of the southwest, including those of Mexico and southern California, were famous for gardens and orchards watered by means of irrigation, a knowledge of which the thrifty Franciscan friars brought, no doubt, from Spain.

The first systematic attempts by Americans at watering arid lands on a large scale were made by the Mormons. They entered Salt Lake Valley in 1847 and created a veritable paradise out of a desert. It is said that 175,000 inhabitants are maintained on 350,000 acres, a person to each two acres. In California the gardens of Spanish missions and the effects of water escaping from miners' sluices early turned attention to the possibilities of artificial watering. The La Grange system, for instance, cost $5,000,000 and waters 250,000 acres. Forty-six per cent of the present enormous fruit crop of California is produced on irrigated lands.

Horace Greeley, the great *Tribune* editor, whose advice was "Go west, young man, go west," had unlimited faith in irrigation. He was one of the promoters of the irrigation colony planted at Greeley, Colorado, in 1870. At this time it is estimated not over 20,000 acres were irrigated in the whole United States. From this date onward, however, irrigation canals were extended rapidly. In 1909, 2,500,000 acres of Colorado land were irrigated.

The following latest available statistics, are exclusive of rice plantations:

Average cost per acre of constructing ditches	$7.80
Annual cost of maintenance	$.38
Average value of crop per acre	$14.81
Average value of land per acre	$42.53
Number irrigated farms	108,218
Number of acres irrigated	7,539,545
Cost of canals, ditches, etc	$67,770,942
Value of irrigated crops	$86,260,491

California led in the number of irrigated farms; Colorado in the number of acres. Montana, Utah, Wyoming, Idaho, Nevada, Oregon, New Mexico, Arizona, and Washington followed, in the order named. In 1909 10,000,000 acres or about 2 per cent of our arid land was irrigated. When all the water shall have been used to advantage it is thought that about one-tenth of the arid region will be provided for.

Of the different methods of obtaining water, the gravity method of drawing a supply in ditches from the head waters of streams and mountain lakes is the cheapest. When water cannot be had in this way, it may be lifted by pumps or secured by boring artesian wells. Speaking for 1909, about 200,000 acres of California fruit lands and 400,000 acres of rice land in Texas and Louisiana are irrigated by pumps. Probably 750,000 acres of American soil are watered in this way, but over nine-tenths of our irrigated area obtains water by the first method. In India 13,000,000 acres are irrigated by water pumped from wells. In whatever way water is obtained it is necessarily conducted to the fields in a ditch or flume with some fall. Two or three ways of applying the water are employed. In the Mission and Mexican gardens and in level fields the ground is usually laid off into level plats, or possibly terraces, surrounded by dirt ridges, with the idea of confining the water in pools. When fields have a gentle, uniform slope, it is customary to liberate the water from a ditch all along the upper edge and allow it to spread in a thin sheet over the entire surface of the field and flow into a catching furrow or ditch at the lower side. Another method yet is to plant crops in rows according to the slope of the ground, and liberate water

slowly at the upper end of rows, so that it will follow the furrows between the rows to the lower end of the field. Among the interesting devices of irrigation is a canvas dam used to stop the water in a supply ditch and cause it to overflow. It is simply a canvas flag. The pole is laid crosswise of the ditch and the flag is fitted to the bottom and sides of the ditch with a few handfuls of mud. The weight of accumulating water presses the edges against the ditch, forming a perfect temporary dam. Distributing gives lads a fine opportunity to play in the water.

Irrigated crops are surer than crops dependent on rainfall, and averages show that irrigated crops run heavier than rain crops, but an artificial supply of water requires intelligent management. Usually the supply to each farm is determined by water rights. After a farm has drawn its rightful supply the rest belongs to others further along the line, and not another gallon may be drawn from the supply ditch. These remarks apply to a colony ditch constructed under a definite agreement as to how large the stream to which each farm is entitled and what length of time. A water-master or ditch rider is appointed for the season to open and close water gates according to each man's rights. In localities irrigated by no fixed colony plan the first settler to tap a stream or lake is entitled to a ditchful of water at pleasure. He may sell shares in his right, that is to say, in the water of his ditch, but none may draw from the stream higher up or from the same lake to the lessening of his water supply, much less tap his ditch above his farm. After water runs on past a farmer he has no further claim on it. In an arid region any surplus water that passes is eagerly caught by the next man, especially in regions where the streams, usually from the mountain snows, are not sufficient to irrigate more than a fraction of the rich land lying barren below for want of moisture. A farmer needs to know how and when to make the most of his water privileges. Too much water or too long watering is more disastrous than drouth.

The supply of water is naturally limited. In regions of irrigation there is usually more land than water. Land with water rights may be, and frequently is, valued at from $50 to $200 or even $500 an acre, while land of similar quality by the side of it, but without water privileges, is scarcely worth paying taxes on. The acreage of irrigated lands is increasing rapidly. Several large streams, as the Yellowstone, are but partly utilized; yet it is evident that only a fraction of the rich, but arid lands of the West can be reclaimed by surface water. Water for irrigating vegetable gardens is obtained from artesian wells in Algiers, Texas, and South Dakota, but whether artesian water can be had in large quantities is a question for the future.

In 1894 Congress passed the Carey Act. It was considered a freak at the time, but it has proved a wise measure. Under this act the general government offered 1,000,000 acres of semi-arid land to each state that would undertake to irrigate the same and sell to actual homeseekers. Five states, Colorado, Wyoming, Idaho, Oregon, and Washington, accepted the grant. The general plan contemplates the organization of irrigation companies working with private capital under state supervision. The state grants the company a water right for an irrigation project, and sets aside the lands desired for the purpose. The fact that the company is in a sort of partnership with the state enables it to sell irrigation bonds to advantage. The state conveys title to the settler, who pays the irrigation company a fixed price, usually in ten or fifteen installments, for water privileges. The act provides that when ninety per cent of the land has passed into the hands of private owners, the irrigation company steps out, turning the project over to the settlers. The scheme has worked well. A large amount of land has been irrigated. Idaho has asked for and has received an additional 4,000,000 acres. The irrigation companies have made money, settlers have secured valuable homes, and the agricultural interests of the various states have been strengthened materially. Some fault has been found because speculators have gotten in ahead and have derived enormous profits; but that is likely to happen in the development of any new country. The speculator has a particular advantage in instances of this sort, because his lands are

necessarily taken in with public lands when an irrigation project is organized.

Of the projects opened under the Carey Act, that of Twin Falls, Idaho, is noted. There are a number of projects in Washington and in the Big Horn Basin in Wyoming. Fifty thousand acres in the valley of the Little Snake in Fremont County, Idaho, have been irrigated. There is a project in southwestern Wyoming on the Green River which embraces 40,000 acres of public land, together with a large block of private lands.

In 1902 Congress passed the so-called Reclamation Act, providing that all funds in excess of five per cent received from the sale of public lands in Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming, should be set apart for the irrigation of arid lands in those states and territories. In 1909, the sum of $70,000,000 was in sight for the work. Contracts were then made for the expenditure of about $20,000,000 on irrigation projects in Arizona, Colorado, Idaho, Nebraska, Nevada, and New Mexico. It has been estimated that, in the sixteen states and territories mentioned in the Reclamation Act, there are from 50,000,000 to 60,000,000 acres of reclaimable lands—enough, perhaps, to support a population of 15,000,000 or 20,000,000 people. In each case the cost of the irrigation works is charged *pro rata* against the acreage which is improved, and the settlers pay the expenditure back to the government in ten installments.

Among the systems completed under the Reclamation Act are the Truckee-Carson, costing $9,000,000 and capable of irrigating 385,000 acres, worth at the outset $1,000,000,000; the Snake River project in Southern Idaho, watering 250,000 acres; the Gunnison project in Colorado which involved the construction of a tunnel six miles long through a mountain; the North Platte River project in eastern Wyoming and western Nebraska, irrigating 150,000 acres. The Platte Dam is 210 feet high. The Arrowrock Dam across the Boise River in Idaho extends 350 feet above bed rock. The water irrigates 350,000 acres. The Belle Fourche project in South Dakota will bring 80,000 acres under cultivation. The Palouse irrigation scheme covers 100,000 acres in Washington, capable, it is believed, of maintaining a population of 60,000 people.

The Salt River project in Arizona creates a lake eighteen miles long, four miles wide, and 275 feet deep. The dam of masonry which closes the canyon is 165 feet thick at the base. The top is wide enough to serve as a bridge and wagon road. One million dollars was spent in getting ready for the actual construction. When the water was ready for use 200,000 acres of desolation were converted into orchards and fields of alfalfa. Other important projects completed are the Yuma, in California and Nevada, 85,000 acres; the Minidoka, Idaho, 60,000 acres; the Huntley and the Milk River, Montana, 235,000 acres; the Fort Buford, Montana and North Dakota, 60,000 acres; the Hondo, New Mexico, 10,000 acres; the Bismarck, North Dakota, 15,000 acres; the Malheur, Oregon, 100,000 acres; the Klamath Falls, Oregon and California, 236,000 acres; and the Shoshone, Wyoming, 125,000 acres. In 1919 there were 31 projects completed, irrigating over 3,212,000 acres. The United States may have seemed negligent of great possibilities, but the nation is young and is certainly making up rapidly for time lost.

Irrigation presents many problems of its own. Much more water is needed than is popularly supposed. In addition to rainfall, the rice fields of Texas and Louisiana require to be flooded with a total of about two feet of water, not all at once, of course, but this amount of water must be supplied from time to time during the growing season. In the West the season for irrigation opens April 1st and closes September 15th. According to the reports of the United States Department of Agriculture, the principal crops require the following average supply of water:

	Feet.		Feet.
Corn	1.40	Wheat	2.68
Barley	1.49	Orchard	2.76
Oats	1.73	Alfalfa	3.39
Sugar beets	2.15	Potatoes	3.94

In warm, rainless weather it is useless to sprinkle. The soil must be given a thor-

WENATCHEE VALLEY, WASHINGTON

Showing the Valley in 1903 *Without Irrigation.* Land Worth $125 Per Acre

WENATCHEE VALLEY, WASHINGTON

Showing the Valley in 1909 *Irrigated* and Bearing Fruit. Land Worth $2,500 Per Acre

ough soaking as often as necessary. Sometimes a dam bursts or a canal gives way. The water escapes. Crops parch and die before the breaks can be mended. The loss of water by leakage and seepage is great. Most canals are mere broad ditches dug through the land. Heavy clay soils are best for the purpose. Light ashy and sandy soils allow much of the water to soak away through their sides. Alkali soils have little containing power. Water carrying silt does most of its own work in packing the walls till they are comparatively watertight. In many cases it is necessary to plaster or cement the walls of the canals; but even then the loss of water through seepage in the smaller ditches is considerable. The loss by evaporation must be taken into account. At Phoenix, Arizona, the loss from this cause at the surface of a reservoir or canal is considered six feet five inches yearly; at Reno, Nevada, forty-two inches. The average loss from surface evaporation, that is to say, where standing or running water is exposed to the sun, is placed at from four to six and a half feet—this for the arid region of the Southwest. The loss in the Northwest may be half of this amount. All conditions considered, it may be said for the United States that from forty to sixty per cent of the water that starts finally reaches the field of the farmer.

Three methods of measuring water are in use. The miner's inch has been inherited from pioneer days. It is the amount of water that will flow through a hole an inch square, situated four inches below the surface. A farmer desiring to use this method of testing the amount of water he is getting dams up his ditch with a board made for the purpose. It is provided with a horizontal slot closed by a slide. When the water is dammed back until it stands four inches above the orifice the slide is pushed aside and is adjusted until the amount of water pouring through permits the water held back by the board to stand steadily at the four-inch level. The size of the orifice is then noted. If an inch slot is open ten inches, the ditch is supplying ten miner's inches of water. The second unit of measurement is the cubic foot per second. This method requires a water meter, an instrument that indicates the actual speed of the current. It is in favor with engineers. The third unit is the acre foot, that is to say, water enough to cover an acre of land one foot deep. Contracts may be made in either of the three ways.

See EGYPT; GANGES; PO.

Irving, Henry (1838-1905), a celebrated English actor. His original name was John Henry Brodribb. His education was that of a London clerk. He had a fondness for reading and for attending the theater. In 1856 he appeared in a play for the first time. After attaining success in plays, now little known, he impersonated Eugene Aram and Richelieu. In 1874 he played the part of Hamlet at the Lyceum Theater, London, with such power and originality as to place himself in the front rank of English actors. Four years later he obtained a lease of the Lyceum Theater. Together with Ellen Terry he made and spent a fortune in trying to raise the taste of the British public. His favorite characters were Macbeth, Othello, Shylock, and Richard III. Irving and Miss Terry visited the United States repeatedly and were received with favor. Queen Victoria knighted Irving in 1895. Three years later the University of Cambridge gave him the honorary degree of LL.D.

Irving was a man of intellectuality, wonderful dramatic power, and high ideals. It is not too much to say that he has given the world a new interpretation of Shakespeare's characters. While no man's reputation in the dramatic world could have been greater, it is to be regretted that the British public did not patronize the Lyceum as liberally as Irving had hoped. He was wont to exclaim with bitterness that mediocre, cheap plays received more encouragement than high class plays presented regardless of expense for costumes and scenery. Irving died a poor man. His funeral was held October 20, 1905, at Westminster Abbey. The most eminent people in London, including the representatives of foreign countries, formed part of the vast congregation. He was laid at rest in the Poet's corner, by the side of Garrick. He lies near the statue of Shakespeare in the interpretation of whose plays he won his fame.

Irving, Washington (April 3, 1783 to November 28, 1859), an American author.

He was born in New York, then a city of 23,000 inhabitants. His father, William Irving, was Scotch, the descendant of an armor bearer of Robert Bruce. He was a "blue Presbyterian," an ardent upholder of the colonial cause. Irving's mother, Sarah Sanders, was of Cornish descent. She was a gentle, cheerful, sympathetic woman, who, nevertheless, had her own way in the family and brought up her eleven children to be Episcopalians. The family was intimate with both Dutch and English neighbors.

Washington Irving was the youngest of the family. He was a merry, roguish chap. The old home, of which nothing now remains, was one of numerous flat-roofed buildings. The young lad delighted in getting out through a skylight and running around above people's heads, dropping bits of mortar down the chimneys. These and other pranks gave his strict father much anxiety. In later years, after his parents thought him asleep, Washington used to get out at a window and make his way to the theater. He says of himself that he was "led to believe that everything that was pleasant was wicked."

At school Irving was fond of reading and telling tales, but he abhorred arithmetic. He wrote gladly for the other boys and got them to solve his problems for him. Owing to feeble health the young lad was not sent regularly to school, nor did he follow his elder brothers to Columbia College. He received a little desultory instruction in Latin and in music. He continued his reading, however. His favorite books were *Sinbad the Sailor, Gulliver's Travels, Robinson Crusoe,* and *Pilgrim's Progress.*

As he grew up Irving was set to read law, but he did not like the subject. He was a "heedless student." He gave little attention to his studies but carried on an extensive course in general reading. In 1804 his brothers, who were now in business, sent him to Europe in quest of pleasure and health. He was so full of pranks that the captain is said to have remarked: "That chap will go overboard before we get across." He saw Nelson's fleet in the Mediterranean, ready for the battle of Trafalgar. He visited Rome, and was much taken with the idea of becoming an artist. He visited Paris and wrote home, excusing himself for delay by saying: "I am a young man, and in Paris." In London he had the pleasure of hearing John Kemble and the renowned actress, Mrs. Siddons.

On his return to New York Irving resumed his study of the law, and was admitted to the bar in due time; but, as before, he spent the greater part of the time in reading literature, and in attending social gatherings and teaparties as well. He was considered one of the most brilliant young men in society. In 1809 his betrothed, a Miss Hoffman, a daughter of the lawyer in whose office he had studied law, died. Irving never married. He kept her Bible, prayer book, her picture, and a lock of her hair always with him.

As early as 1802, before going to Europe, he had contributed humorous sketches over the name of Jonathan Oldstyle to the *Morning Chronicle,* a paper edited by an older brother, Peter. In 1807 he joined with three other young men, a brother, a brother-in-law, and James K. Paulding, in the publication of a little fortnightly periodical, *Salmagundi.* It has been called "The American Spectator." It was a bright, breezy affair, full of humorous hits and local allusions. Irving contributed the *Whim-Whams and Opinions of Launcelot Longstaff.* Twenty issues appeared.

Irving's next literary venture was *Diedrich Knickerbocker's History of New York.* It appeared anonymously. It was advertised as proceeding from a small, elderly gentleman in black coat and cocked hat, who had left a manuscript behind him at the Columbian Hotel, Mulberry Street. It was taken for genuine history by some Europeans. It was hailed by the literary world, including Walter Scott, as a "most excellently jocose history, a masterpiece of humor." It brought Irving $3,000.

In 1815 Irving's brothers formed an importing house and sent him to England to assist in carrying on the European end of the business. He accomplished little in a business way, but the result of his *Knickerbocker's History* gained him the acquaintance of Keene, Kemble, Moore, Jeffrey, Murray, Scott, and other literary notables. He visited Scott at Abbotsford. During

this period of his life Irving wrote *The Sketch Book,* signing it Geoffrey Crayon. Geoffrey declared, "I have no wife, no children, good nor bad, to provide for. I am a mere spectator of other men's fortunes." *The Sketch Book* is a collection of sketches, written as by a leisurely traveler. It included his best productions. His first sketches were published in Philadelphia. Through the efforts of Walter Scott, Murray, the London publisher, was induced to bring out a British edition.

Irving's reputation, as well as an income from literary sources, was now secure. He had, no doubt, a faith that prosperity was coming, for he had already turned aside friends who desired to put him in the way of the mayoralty of New York, a seat in Congress, and a secretaryship worth $2,500 a year under President Van Buren.

The Sketch Book appeared in 1819. *Bracebridge Hall,* a similar volume, spoken of sometimes as the "English Sketch Book," appeared in 1822. Murray offered him $5,000 for it without seeing the manuscript. The "original home," immortalized by Irving in this book, is Ashton Hall, in the vicinity of Birmingham. *Tales of a Traveler* followed soon after. From 1826 to 1829 Irving was secretary of the American legation at Madrid. He collected a large amount of historical material which he used later in *A Life of Columbus.* During the summer of 1829 he lived in an apartment of the Alhambra yet shown to visitors. It was here, on historic ground, that the inspiration came to him for his *Conquest of Granada* and *The Alhambra,* spoken of sometimes as "The Spanish Sketch-Book." In 1829 he was transferred to the legation at London. Oxford University made him a Doctor of Laws.

In 1832 he returned to New York. Although a master of English he is said to have broken down utterly in an attempt to make a speech at a banquet in his honor. About this time Irving purchased a Dutch stone cottage on the banks of the Hudson at Tarrytown. The name has been changed since to Irvington in his honor. The house belonged formerly to the Van Tassels. It was a cosy home, picturesquely situated. Ivy slips from Melrose Abbey soon covered it with a mantle of green. Among his proud possessions was the venerable weathercock that once surmounted the Stadt-House of New Amsterdam. He set it on the gable of his house. Irving called his home Sunnyside. It is described in his *Wolfert's Roost.* His income was ample. He invited a brother to settle with him here. His nieces, with whom he was fond of romping, continued to occupy the cottage at the close of the nineteenth century.

In 1842 Irving was appointed minister to Spain. He remained abroad four years. His residence at Tarrytown was interrupted by a trip to the West, which resulted in his writing *A Tour on the Prairies, Astoria,* and the *Adventures of Captain Bonneville.* His last work of importance was a *Life of George Washington* in five volumes. It appeared in 1855-9. Other biographies were *Oliver Goldsmith, Mahomet,* and *Columbus.* Irving's New York publisher was G. P. Putnam, who stood to him in much the same relation that James T. Fields afterward held to the poets of New England.

In person Irving was a man of medium height, rather stout in build. He had dark gray eyes, delicate eyebrows, a straight, handsome nose, and a shapely head. He was a humorous, modest, genial, sunny man, very sensitive in his nature. He was an amiable man in society, and free from literary jealousies. In this and many other respects he was much like Walter Scott, for whom he had a profound admiration. He was buried by the side of his mother in Sleepy Hollow near Tarrytown.

In point of rank the world has long since given Irving an eminent place among men of letters. He entered into the departed glories of the Moors and repeopled the Alhambra as no other writer has done. He described Westminster Abbey with such simplicity and feeling that Charles Kingsley, himself a master of English prose, felt his own pen fall powerless. He loved the ancestral halls, the lanes and hedges of England, as few of her native sons have done. He entered into the life of Abbotsford and made Walter Scott his friend for life, and yet, all said, the scenes of his greatest work are near at hand and at home. He is to the Catskill Mountains and the lower Hudson what Scott is to the Trossachs, to Edinburgh, and the Tweed.

The Alhambra, Westminster Abbey, and Abbotsford might have been described by another, but no other hand than Irving's could have painted Sleepy Hollow. No other eye could have seen Ichabod Crane as he saw him. His greatest creation is Rip Van Winkle, a unique character in literature.

See CATSKILLS; JEFFERSON; WESTMINSTER.

SAYINGS OF IRVING.

The Almighty Dollar.

A man as he grows old must take care not to grow musty, or fusty, or rusty—an old bachelor especially.

When I cannot get a dinner to suit my taste, I get a taste to suit my dinner.

The idol of today pushes the hero of yesterday out of our recollection; and will, in turn, be supplanted by his successor of tomorrow.

SAID OF IRVING.

Before Irving there was no laughter in the land.—Beers.

His writings are my delight.—Byron.

For fifty years, Irving charmed and instructed the American people and held the foremost place in their affections.—Warner.

To a true poet-heart add the fun of Dick Steele,
Throw in all of Addison, minus the chill,
With the whole of that partnership's stock and good-will,
Mix well, and while stirring, hum o'er, as a spell,
The fine old English Gentleman, simmer it well,
Sweeten just to your own private liking, then strain,
That only the finest and clearest remain,
Let it stand out of doors till a soul it receives
From the warm, lazy sun loitering down through green leaves,
And you'll find a choice nature, not wholly deserving
A name either English or Yankee—just Irving.
—Lowell.

Irvington, New Jersey, a rapidly developing industrial city of Essex County, is three miles from Newark and fourteen miles west of New York City, on the Lehigh Valley Railroad. Settled as early as 1666, Irvington had a population of only 5,255 in 1900, while in 1920 the population was 25,480. The principal products of the city's numerous manufactories are smelter and foundry products, leather, linoleum, automobiles, lumber, refinery products, mason's materials, novelties, machinery, and many other commodities. The city contains a large park, Bethany Home and Elks Home, and has good public schools and a library.

Isabella, Queen of Spain. See COLUMBUS; FERDINAND; CASTLE; ARAGON.

Isaiah, a great prophet of Judah who lived in the eighth century, B. C. Isaiah prophesied in the reigns of Uzziah, Jotham, Ahaz, and Hezekiah. We know little of his personal life; he had three sons who were a great joy to him, and he stood high at court, for in the book of Isaiah he speaks very familiarly of court life and customs. His writings, though of surpassing poetic beauty, are full of gloomy denunciation of the people for their sinfulness and lack of faith in God. In the reign of Ahaz war was made against Judah by the kings of Israel and Damascus. Isaiah exhorted Ahaz to meet the raiders calmly looking to God for support. Ahaz defeated the enemy, but turned for help to Tiglath-pileser, king of the Assyrians. This alliance displeased Isaiah bitterly, and he foretold that through it dire things should befall Judah; nor was it long before Judah was chafing under bondage to these very Assyrians. So bitter did the yoke become that Hezekiah, the king, formed an alliance with the Egyptians, and planned a revolt against the oppressors. Again Isaiah bitterly opposed their turning for help to anyone but Jehovah, and foretold the disastrous results which would follow; but Hezekiah would not be dissuaded, and the Kingdom of Judah was almost destroyed. Then the people turned back to God, imploring Him to help them, but Isaiah told them to mend their evil ways.

Isinglass, ī′zĭn-glas, a particular pure, transparent form of animal gelatine. The material is much the same as that of fish scales. The supply of isinglass is obtained chiefly from the air bladders of certain fishes. Formerly the sturgeons of the Caspian and Black Seas were the main source of supply, but Brazil, the East Indies, and the Hudson Bay company now furnish a part of the isinglass of commerce. The name has been applied popularly but incorrectly to the thin sheets of mica used for the panels of coal stoves, which resembles isinglass in appearance only. Isinglass panels would burn out instantly. Isinglass dissolves readily in hot water. In cookery, it is used

to make jellies, blancmange, and to thicken soup. Being akin to glue, it is used in the manufacture of certain cements and court-plaster. It is employed as a sizing also to stiffen silks, gauze, and linen. See STURGEON.

Isis, ī′sĭs, the chief goddess of the Egyptians. She was the sister and wife of Osiris, their chief deity. He represented the sun. She represented the moon. The cow and the lotus were sacred to her. The figure of Isis, oftentimes adorned with the horns of a cow, appears frequently in Egyptian art, especially in the adornment of cave temples and elsewhere. See OSIRIS.

Islam, the religious system of Mohammed. The term is from the Arabic, meaning obedience to God, submission; hence the true faith. The word is general in its application, corresponding to Christianity, Buddhism, etc. See MOHAMMEDANISM.

Island, ī′land, a body of land surrounded by water. An island differs from a continent only in size. Now that Australia is regarded as a continent, Greenland, with an area of 827,300 square miles, is the largest island. New Guinea, Borneo and Baffin Land rank next. Great Britain is seventh in size; Cuba, fourteenth; Newfoundland, sixteenth; Iceland, seventeenth; and Ireland twenty-first.

Islands are classified usually as continental and oceanic. The former fringe the continents and are geologically connected with them. They are separated from the mainland usually by shallow seas. Save Iceland, all the islands named above are continental in origin. Continental islands are found to have the same animals and plants as the mainland of which they have formed a part. They contain rocks like granite and limestone. Oceanic islands are usually the summits of submarine volcanic islands. Their rocks are basaltic, formed of cooled lava. St. Helena, the Fiji Islands, Iceland, Stromboli, and the Hawaiian Islands are of this sort. Many low, flat islands prove to be of coral growth. They are coral reefs growing on a firm base that comes to within not less than twenty fathoms from the surface. Not infrequently flat islands are formed off the mouth of rivers by material carried down by the current and tossed back by the waves and tide.

Omitting the little known bodies of ice and land north of Hudson Bay, and the Antarctic land and ice polar cap, the following is a list of important islands and area of each in square miles:

Name	Square Miles
Greenland	827,300
New Guinea	330,000
Borneo	280,000
Baffin Land	236,000
Madagascar	228,000
Sumatra	160,000
Great Britain	88,603
Honshiu	87,500
Celebes	72,000
Prince Albert Land	60,000
South Island, N. Z.	58,500
Java	48,400
North Island, N. Z.	44,500
Cuba	44,164
Luzon	41,000
Newfoundland	40,200
Iceland	40,000
Ellesmere Land	40,000
Mindanao	37,000
Hokkaido	36,500
Ireland	32,600
Sakhalin	29,100
Haiti	28,800
Tasmania	26,200
Ceylon	24,700

Isle of Man, an island of the United Kingdom. It is situated near the center of the Irish Sea. The area is 227 square miles; the population 54,758. The island is mountainous, the chief peaks rising to a height of 2,000 feet. Portions of the shore are precipitous. Other portions afford harbors for a large fishing fleet. Douglas, the largest town, has a population of 15,719. The island is granitic, with upper strata of limestone which by weathering create soil of fertility. The valleys and lowlands are in a state of high cultivation. The inhabitants are called Manx. They are a Celtic people allied to the Welsh and Irish. Owing to intercourse with England and the establishment of English schools, the native language is almost extinct. Acts of Parliament do not bind Man, unless specifically mentioned. The administration is in the hands of a governor and council. Local legislation is entrusted to the House of Keys of twenty-four members. It is thought to be the oldest legislative body in existence. Its acts are proclaimed from the Tynewald, an elevated spot where the Manx have been wont to meet for centuries for the purpose. There are two judges,

known as deemsters. There are frogs, but not snakes on the island. Hares, rabbits, red-legged crows, grouse, snipe, waterfowl, and rock-pigeons abound. The Manx cat, with a short, rabbit-like tail, is common. The chief productions of Man are lead, tin, black marble, horses, cattle, sheep, cloth, nets, twine, rope, and boots. Fisheries of herring, cod, and mackerel employ many boats and men. The island is a favorite summer resort, the season lasting from May to September. Popular interest has been aroused through Hall Caine's novels, *The Deemster, The Manxman,* etc.

Isotherms. See CLIMATE.

Israel, a name given to Jacob after he had wrestled successfully with the Angel of the Lord, as related in Genesis xxxii. The name is Hebrew for "soldier of God." Hence the Hebrews were called the children of Israel, and the people of Israel, the Israelites. About 953 B. C. the northern tribes seceded from the southern tribes and set up an independent monarchy under Jeroboam. Other kings were Ahab and Jehu. This kingdom was called Israel. The citizens were carried into captivity by Sargon about 722 B. C. They are henceforth unknown to history and are spoken of as the Ten Lost Tribes of Israel. See JEWS.

Isthmian Games. See OLYMPIC GAMES.

Italian Language. See LANGUAGE.

Italian Literature. See LITERATURE.

Italy, a kingdom occupying the southern peninsula of central Europe. In general outline it bears a striking resemblance to an old-fashioned cavalry boot, such as was worn in England at the time of the Cavaliers and Roundheads,—a boot with a tall leg rolled in a fold above the knee. The heel of the boot is towards Greece, the toe points towards Sicily and Spain. Under the instep lies the Gulf of Taranto. Sicily, Sardinia, and many small islands are reckoned as part of Italy. Corsica belongs to France.

TOPOGRAPHY. We regard Italy as a mountainous country, but it is not wholly so. The Alps spring like an arch from sea to sea. The western end rests on the Mediterranean at Nice; the eastern end rests on the head of the Adriatic. Within this arch lies one of the great river valleys of Europe, —the plains of Lombardy. They are so extensive and level that a military road leaving the Adriatic at Rimini stretches northwestward for hundreds of miles without a change of direction, and with but slight changes in level. The Apennines, beginning in the vicinity of Nice, run eastward nearly to the Adriatic Sea, then southeastward throughout the entire length of Italy. Innumerable spurs extend from the main range eastward and westward, affording slopes for the vine and olive and inclosing pocket-like valleys of great fertility. The low river lands are wider at the western foot of the Apennines than at the eastern. Counting the valley of the Po, fully three-fourths of Italy is drained into the Adriatic Sea. The largest river on the western slope is the Tiber.

The main mountain chain is about 800 miles long and from twenty-five to eighty-five miles wide. The peaks run from 5,000 to 7,000, and even 9,000 feet in height. The highest is Monte Corno, 9,585 feet high. There are frequent passes permitting the building of highways and railroads. The Alps are penetrated by four lines of railway running from Turin to Paris, Milan to Basel, Verona to Munich, and Venice to Vienna, respectively. Eight railway systems cross the Apennines.

MINERALS. Italy is at base granitic, but the mountains are covered usually with disintegrating limestone and basaltic rocks, forming soil of great fertility. There are deposits of coal, petroleum, asphalt, salt, borax, graphite, arsenic, gold, silver, manganese, mercury, antimony, iron, zinc, lead, copper, and sulphur. Sicily is noted for sulphur mines. Iron ore comes from Elba.

CLIMATE. The climate varies greatly. The foot of Italy has an arid, hot climate, like that of northern Africa. Vegetation is scorched by hot winds. Central Italy is noted for springs and cool streams. It is the country of the fig, the olive, and the vine. With the aid of irrigation, the valley of the Po is one of the most fertile and productive regions in the world.

ANIMALS. The mountains still shelter the common wild animals of Europe. The wild sheep is found in Sardinia. The porcupine, the red fox, the blind mole, the

wolf, brown bear, chamois, and lynx still cling to the spurs of the Apennines. The song birds are those found elsewhere in Europe. The European vulture, as well as the asp, are found in the south. The scorpion and the tarantula are also to be found.

AGRICULTURE. Agriculture is the chief occupation of the Italians. The chief field crops are wheat, maize, oats, rye, barley, hops, rice, potatoes, hemp, flax, cotton, madder, and tobacco. Less than fifteen per cent of the country is unproductive. Two-fifths of the country is under cultivation, one-fifth in meadows and pastures, one-fourth in orchards and forests. Chestnut forests are to be seen everywhere. The peasants roast the chestnuts and grind them for flour from which they make an inferior sort of bread. Italy is one of the olive oil and wine-producing countries of the world. The annual production of olive oil is about 60,000,000 gallons. The production of wine is about 725,000,000 gallons. Oranges and lemons are produced chiefly from Naples southward. The ordinary domestic animals are reared, including a few thousand eastern buffalo used for draft oxen. A few herds of camels are kept near Pisa.

FISHERIES. The fisheries of Italy are of importance. Anchovies and sardines are canned for export in enormous quantities. Tunnies are shipped to the principal cities of Europe. The red corals of the Mediterranean are gathered and manufactured into trinkets that yield a large revenue. There are also important sponge fisheries.

TRANSPORTATION AND COMMERCE. Italy is well supplied with railroads. They are owned chiefly by the state, but are leased to private companies. The chief ports are Genoa, Leghorn, Naples, Miseno, Palermo, and Venice. Commerce is carried on chiefly with Great Britain, the United States, Germany, France, Austria-Hungary, and Russia. The chief exports are silk and silk goods, eggs, wine, olive oil, fruit, macaroni, dyestuffs, marble, hemp, wine, toys, gloves, paper, jewelry, violins, earthenware, cutlery, silverware, articles of alabaster, pottery, glass beads, straw braid, silk hats, chemicals, soap, pickles, and sausage. Coal, wheat, cotton, wool, sugar, coffee, machinery, and railroad material are imported.

INDUSTRIES. The Italians are noted for their skill in cutting cameos and intaglios, for working in gold and silver, the making of superior silks, brocades, straw hats, alabaster work, tableware, terra cottas, and many other kinds of hand work requiring skill and artistic taste. It is not as yet a country of large manufacturing establishments.

HISTORICAL. The history of Italy is too extensive and complex to be told here. From the partition of Charlemagne's empire in 843 to the unification of Italy in 1870 the peninsula was the scene of an endless succession of feuds. Savage wars were carried on between duchies, petty monarchies, and struggling republics, or between sections of the country and foreign masters, particularly the house of Austria. For centuries the city of Rome and adjacent territory, at times including the greater part of Italy, was subject to the rule of the pope. The outbreak of the French Revolution found Italy completely broken up into petty states organized as little republics, or governed by the pope or by creatures of the Austrian empire. The French poured over the Alps and, with the exception of Venice, drove the Austrians out of Italy. When Napoleon became emperor he organized the greater portion of Italy into kingdoms for his relatives. At the downfall of Napoleon the Congress of Venice reëstablished the Austrian influence. During the ensuing half century an intelligent desire for a free, united, and independent country arose. Cavour, Mazzini, Garibaldi, and other Italians gave their lives to the work. The organization known as the Carbonari, or Charcoal Burners, and Young Italy pushed on the work. Victor Emmanuel, king of Sardinia, and his prime minister, Count Cavour, a sort of Italian Bismarck, raised the kingdom of Savoy to much the same rank in Italy that Prussia and Brandenburg attained in Germany. When the Crimean War broke out Cavour joined the English and French against the Russians for the express purpose of attaining a seat in the council board of nations. One step led to another. The sympathies of the world were with the Italians. In 1859 Napoleon III

joined Victor Emmanuel in a war against the Austrians to gain Venetia and Lombardy. The brilliant victories of Magenta and Solferino belong to this campaign. By this war Lombardy was added to Sardinia, though Sardinia was obliged to cede Savoy and Nice to France for its assistance. In 1859 Victor Emmanuel established his court at Florence. Southern Italy, including Sicily, was incorporated in the new kingdom in 1861. In 1866 Italy took the side of Prussia in the war with Austria and received Venice as a reward. During the French and Prussian War of 1870-71, Victor Emmanuel took possession of the papal states and removed his capital to Rome. In 1915 Italy declared war on Austria, thus joining the Allies in the Great War.

GOVERNMENT. The government of Italy is a constitutional monarchy, organized on a plan very similar to that of England. The Parliament consists of two chambers,—a Senate and a House of Deputies. Only those who are sufficiently intelligent, or who are owners of property, are permitted to vote. Local affairs are managed by officials chosen by the communes which correspond to our townships. Freedom of religious worship is permitted to all. The government has required the establishment of public schools. Attendance is compulsory. There are now between 3,000,000 and 4,000,000 children in school. The attendance is increasing rapidly. Illiteracy is diminishing. One hundred fifty-one normal schools and twice as many industrial schools have been established. High schools and academies prepare the way for admission to twenty-one Italian universities. There are nearly 2,000 public libraries. While statistics do not show that criminals have decreased of late, this is probably due to the greater certainty of punishment of crime. Pauperism and beggary have diminished. The general government levies taxes on lands, house incomes, and manufactures, collects duties on imports, and has a monopoly of the sale of salt and tobacco. Taxes are heavy. The public debt is large. An army of 250,000 men is maintained. About one-tenth of the men are actually under arms in time of peace. Great expenditure has been incurred in the building of a navy and in constructing coast defenses.

LANGUAGE AND LITERATURE. The Italians are descendants of the ancient inhabitants of the peninsula, with an admixture of blood from northern Europe. They are a sociable people. In rural Italy separate farm houses or cottages are unknown. Even the herdsmen gather in hamlets. It is said that the peasantry in the sheltered portions of the Apennines have changed little since the days of Roman supremacy. They speak the language, wear the same kind of clothing, build the same kind of a house, and use the same lamps and cooking utensils that were to be seen in the day of Cicero and Caesar. Many different dialects are spoken in Italy. People living 100 miles apart cannot understand each other. Modern Italian, that is to say, the language of Italian literature, was developed in the valley of the Po. Florence bears much the same relation to the language of the people that London sustains to the English language. Students of Italian literature claim that both language and people developed in this locality little influenced by the hordes of northern barbarians who broke in upon Italy at the breaking up of the Roman Empire.

According to the *Statesman's Year Book* the total area of Italy, including Sicily and Sardinia, is 110,632 square miles—half as large as Texas. Three hundred and sixty-five thousand Italians emigrated in 1920, a great part of them to the United States; but vital statistics for recent years show that tens of thousands of Italians annually return to their native land, 90,000 returning in 1919. Under the new American immigration laws, Italy's quota is 42,000 annually, of which, in 1922, she sent 41,000. In the United States, the newcomers from Italy tend to congregate in the large cities.

RECENT HISTORY. Italy played a large part in the World War, her troops cooperating splendidly with the French and English. When the European boundaries were adjusted, Italy received from Austria the territory comprising Trentino, Goriza and Istria, and was also allotted Zara, in Dalmatia, and several small islands in the Adriatic. By securing Istria,

Italy gained the City of Trieste, the most important Adriatic port.

A significant feature of the early post bellum political situation in Italy was the formation, in 1919, of the Facisti, an organization of returned soldiers sworn to crush bolshevism. Socialism had grown until its adherents had become important in Italy's political and industrial life; and the task that the Facisti set itself was difficult. So strong had the radical elements become that dissention between the radicals and conservatives amounted to civil war, and so disorganized the political life of the country that it was impossible to establish a strong, responsible government.

The Facisti was organized by a returned veteran, Benito Mussolini, himself a former Socialist. After removing the fear of bolshevism, the Facisti, and especially Mussolini, turned to the further task of establishing a responsible government and uniting Italy into a strong, centralized state.

The Facta cabinet resigned in July, 1922; several other leaders attempted, but without success, to form a government; Facta was prevailed upon by King Victor Emmanuel to form another ministry; and this ministry fell and left Italy practically leaderless for ten days. The Facisti had been watching events in Rome, and marched upon the capital in October, 1922. On the thirtieth of that month, the King invited the new leader, Mussolini, to form a cabinet. This he did, displaying unusual acumen in the choice of his ministers. See MUSSOLINI, BENITO.

STATISTICS. The following are the latest reliable statistics to be had:

Area, square miles	110,632
Forest area, acres	175,000
Population (estimated)	36,120,000
Chief Cities:	
Naples	697,917
Milan	663,059
Rome	590,960
Turin	451,994
Palermo	345,891
Genoa	300,139
Florence	242,147
Bologna	189,770
Venice	168,038
Messina	150,000
Number of provinces	69
Members of senate	368
Members of chamber of deputies	535
National revenue	$4,268,000,000
Bonded indebtedness	$ 742,554,000
Farm area, acres	65,995,000
Wheat, bushels	188,126,000
Corn, bushels	94,484,000
Rye, bushels	5,634,000
Oats, bushels	37,774,000
Barley, bushels	10,362,000
Potatoes, bushels	55,116,000
Flax seed, bushels	386,000
Rice, pounds	14,030,000
Tobacco, pounds	28,260,000
Raw silk, pounds	7,330,000
Sugar beets, tons	149,913
Olives, gallons	352,000,000
Wine, gallons	726,000,000
Domestic Animals.	
Horses	989,786
Mules	496,743
Asses	949,162
Cattle	6,239,741
Buffaloes	24,026
Sheep	11,753,910
Goats	3,082,558
Swine	2,338,926
Ships built, tons	133,190
Silk cocoons, tons	3,000
Sugar, tons	170,466
Iron ore, tons	427,000
Copper, tons	15,800
Manganese, tons	39,700
Lead, tons	44,600
Zinc, tons	105,400
Sulphur ore, tons	325,600
Boric acid, tons	1,880
Mineral fuel, tons	1,913,800
Mercury, tons	1,540
Iron and cuprous pyrites, tons	353,600
Antimony, tons	960
Quarry products, value	$12,347,864
Fish, value	$3,494,700
Imports	$3,172,427,150
Exports	$1,560,758,300
Teachers in public schools	75,993
Pupils enrolled	3,792,024

Itasca, ĭ-tăs'ka, a small lake in northern Minnesota. It is the source of the Mississippi. It was discovered by H. R. Schoolcraft and the Reverend W. T. Boutwell in 1832. The latter states that they coined the name from *"Veritas caput,"* bad Latin for "the true head." By cutting off the first syllable and the last, a word was left having an Indian sound. The lake occupies a heart-shaped depression in the glacial drift which covers the country. Its area is only 1,130 acres. The river is about twenty feet wide and a foot deep, as it issues from the northern point. The southern end of the lake divides into two arms. A number of brooks and springs

keep the water at a permanent stage. The surrounding bluffs are perhaps from twenty to 100 feet in height. The region is covered with tamarack swamps, hazel brush, and poplar and pine forests. Minnesota has set aside thirty-five square miles as a state park. A hotel has been built for the entertainment of tourists. A canoe trip from Lake Itasca down the river is quite practicable. The lake is from four to sixty feet deep. Schoolcraft Island of a few acres occupies the center. See MISSISSIPPI RIVER.

Itch Mite. See MITE.

Ithaca, N. Y., the county seat of Tompkins County, is at the southern extremity of Lake Cayuga, 56 miles northwest of Binghampton, and on three railroads, and on a branch of the New York State Barge Canal. This city, the seat of Cornell University, is surrounded by natural beauty. Glens, ravines, gorges and waterfalls surround it. The most notable of the falls are Buttermilk, Enfield, Ithaca, Triphammer and Toughannock. The last named, falling 215 feet, is the highest American waterfall east of the Rocky Mountains. Besides Cornell University, the city contains the State College of Agriculture, the State Veterinary College, a United States weather station, the Cornell Free Library, an excellent system of public schools, Ithaca Conservatory of Music and various preparatory schools.

Important among the city's manufactures are chains for power transmission, traction engines, firearms, signs, furniture, cement, well-drilling machinery, boots, cigars, wall paper, movable school houses and incubators. In 1920, the population was 17,004.

Ithaca was settled in 1789, and had various names until 1806, when it received the present name. It was incorporated as a village in 1821 and chartered as a city in 1858. In the vicinity of Ithaca, at Buttermilk Falls, formerly stood the Catawba Indian village Coreorgonel, which was built in 1753 and destroyed by fire in 1779 by a division of Sullivan's army. A bronze tablet was erected which marks the spot of one of Sullivan's encampments. Ithaca was in former days an important canal port and port of lading for barges on the Erie Canal, but this traffic declined after additional railroad facilities were secured.

Ithaca, one of the Ionian Islands, situated west of Greece and east of Cephalonia, from which it is separated by a narrow channel. Its area is about 38 square miles, the surface being mountainous and the coast steep and rocky. Vineyards and olive and other orchards cover the mountain sides. Fishing is carried on by the inhabitants, another industry being the production of olive oil. Its population is about 12,000. Ithaca is supposed to be the site of the castle of Ulysses, the principal character in Homer's *Odyssey*. Excavations were made by Schliemann in 1869, which corroborated sites named by Homer.

Ito, ē′tō, **Marquis** (1840-1909), a prominent Japanese statesman. His father was a military noble. The son was educated at Nagasaki, studying both English and German. Prince Ito is one of a small band of men who created modern Japan. In 1861-3 he studied in England. In 1870 he visited the United States to study our coinage system. On his return to Japan he established a modern mint at Osaka. He took an active part in building a railway from Tokio to Yokohama,—the first in Japan. Having served with distinction on the board of public works he was transferred to the bureau of the interior. He visited various countries in Europe and America, investigating systems of education and of manufactures and cultivating friendly relations with the nations of the west.

Ito had a constructive mind. He wrote the constitution of Japan. He watched the progress of events in Manchuria, and, like Bismarck in Germany, made ready for a struggle with the Russian bear. The victory that Japan gained on land and sea was due largely to the foresight of Ito. After the Russian War Ito undertook the government of Korea. The Koreans made several attempts to take him and were finally successful. He was assassinated in 1909.

Ito was a man of short stature,—not over five feet three in height,—but the most of his height was body. He was vigorous and untiring—a determined person with strong features and a well formed head. In some

respects he is one of the most remarkable characters in history. Without doubt he is the greatest man that Japan has produced in historic times. He led one of the most conservative nations in the world to abolish an arbitrary monarchy and accept a modern constitution and a modern parliamentary government. He raised a nation of little military repute to the leadership of Asia, and made his country a power to be reckoned with in future international agreements. Senator Beveridge, of Indiana, said:

> The assassination of Marquis Ito is a greater blow to Japan than the loss of half a dozen important battles would have been. He was easily the foremost statesman of the mikado's empire,—indeed, the greatest constructive mind in the orient. One may go further and still be within the limits of conservative opinion in saying that by the test of achievement Hirobumi Ito was the greatest man of his time in any country. For he achieved the apparently impossible task of taking an ancient people, with an inheritance of thousands of years of autocratic government, customs, and ideas, and changing that people into a modern nation. He transformed that government into a constitutional and parliamentary system, and revolutionized the customs and habits of thought of ages into modern ways and scientific ideas. It was a good deal more difficult performance than if some genius were to take Turkey and make Turkey more modern and progressive than the United States in the space of a single lifetime. Ito did all this almost single-handed, or rather, single-handed. For, while he had the loyal and able co-operation of other extraordinary minds and characters, Ito's was the planning brain and has been for more than thirty years.

See KOREA.

Iturbide, ē-toor-bē′dā, **Don Augustin** (1783-1824), an emperor of Mexico. He was a native of Valladolid, Mexico. His father was a Spanish nobleman, his mother a rich creole. When the Mexicans first attempted to throw off Spanish rule the Spanish viceroy put Iturbide in command of the militia; but, instead of putting down the rebellion, Iturbide carried the militia over to the Mexican side. In 1822 the Mexicans made him their emperor and passed a law providing that his son should succeed him. The new emperor was too despotic, however, to suit the Mexicans, or perhaps they chafed under any autocratic government. In less than a year Iturbide was banished and went to Leghorn, Italy, to reside, with a pension from the Mexican Congress of $25,000 a year. A few months later he went to London. In 1824 he sailed for Mexico to recover his lost sovereignty. He landed July 14, and issued a proclamation that he would govern in accordance with the constitution and usages of England. July 17 he was arrested, and July 19 he was shot as a disturber of the public peace. The Mexicans settled a pension on his family.

Ivan IV, ēvän′ (1529-1584), commonly known as Ivan the Terrible. He laid the foundations of the Russian Empire. He enlarged the boundaries of Russia and annexed Siberia. During his reign a printing press was set up in Moscow, but the printers were obliged to flee for their lives. He was a tyrannical man. He killed his own son in a fit of passion. His name is not a pleasant one, but he did much for his country.

Ivanhoe, a novel by Walter Scott. It was written about 1819, when the famous "Wizard of the North" was at his best, and appeared in print the following year. The tale combines romance and adventure. The scene is laid in England in the days of Richard I. The plot is one of the greenwood, archery, Saxon outlawry, Norman oppression, tournament, castle storming, and orderly battle. Gurth, the swineherd; Wamba, the jester; Brian de Bois-Guilbert, the knight templar; Locksley, the green-coated outlaw; Friar Tuck, the fat monk; sturdy Cedric, the Saxon; haughty Front de Boeuf; Richard Coeur de Lion, disguised as the Black Knight, are leading characters. Ivanhoe, the discredited Saxon son, is the hero; but Rebecca, a Jewish maiden, is the noblest of all. *Ivanhoe* is Scott's most famous novel.

Ivory, a hard substance not unlike bone. The teeth of most animals are composed chiefly of ivory. Commercial ivory consists of the tusks of the elephant, the hippopotamus, walrus, narwhal, and a few other animals. An elephant's tusks are incisors. The large teeth of the hippopotamus and walrus are canines. The best ivory is obtained from elephant's tusks. The African elephant furnishes the best ivory known. The tusk of a large African elephant reaches an extreme length of nine feet and a weight of 260 pounds. Those

of the Indian elephant average perhaps fifty pounds in weight. The tusks of the mammoth, an extinct elephant of Siberia, attained a length of twelve feet and a weight of 200 pounds. They are known in the trade as fossil ivory. The present supply of ivory comes from Siberia, India, and Africa. The Congo region, Abyssinia, Senegal, and Gaboon yield large amounts. All sources yield about 1,500,000 pounds a year. London, Antwerp, and New York are the leading centers of the ivory trade.

According to the census for 1921, there were in the United States 44 establishments engaged in the ivory industry, which employed 842 wage-earners, representing a capital of $1,365,784, and products valued at $2,816,530. The ivory auctions of London attract many buyers. As fast as the ivory comes in from Africa and India, it is displayed on the floor of a large ivory warehouse. The tusks are arranged in small lots. Here an enormous tusk lies alone; here half a dozen smaller ones; here a handful of fragments. The parcels are made up with a view to uniform quality. Sound white ivory is not mixed up with cracked or stained tusks. At regular intervals the lots are listed by number in a catalog. The sale is conducted like a book auction.

Ivory is used for a variety of purposes. It is employed in expensive cabinet work. Many ornamental articles, such as knife handles and bangles, are made of ivory. The Chinese and the jewelers of India are skillful in carving images of ivory. Ivory is one of the most elastic substances known. If dropped on a hard surface, an ivory ball will bounce higher than a rubber ball. For this reason it is preferred for billiard balls. These balls are turned from the choicest parts of the tusks and must be kept in a room of uniform temperature for a few days to prevent checking. Ivory is becoming so scarce that a prime billiard ball is quoted at fourteen dollars, though formerly a set could be had for five dollars. No other substance has a touch at once so hard and so velvety. It is indispensable for the keys of high grade pianos. Bone, celluloid, and a palm nut known as vegetable ivory are substitutes, but they are not satisfactory.

See MASTODON; ELEPHANT.

Ivory Coast, The, a French colony in western Africa. It lies between Liberia and the British Gold Coast. Area about 121,976 square miles. There are 835 Europeans in the colony and some 1,545,680 natives. There are plantations of maize, pineapples, bananas, plantains and coffee. The natives bring in forest products, including cocoanuts, rubber and palm oil. Mahogany is exported. Gold to the value of three thousand dollars is obtained annually. The ports are visited by ships from France, Great Britain, Germany and Belgium. A railway between Abijean and Bouaké, 197 miles, has been constructed. There were in 1918, 2,300 miles of telegraph and 117 miles of telephone lines. The number of vessels entered in 1920, was 465.

Ivy, an ornamental evergreen climbing shrub. It belongs to the same family as ginseng and spikenard, which, however, it does not seem to resemble. Our American ivy or Virginia creeper is not an ivy. Our poison ivy is related to the sumach. The ivy of tradition is a famous climber, holding on to stone walls and trellises by means of numerous rootlets. Authorities claim that ivy drains an old wall of moisture by means of its rootlets and that it preserves woodwork and masonry instead of hastening decay. Ivy adds greatly to the beauty of England. It is preëminently a plant enshrined in sentiment and song. Gray in his *Elegy* speaks of "yonder ivy-mantled tower." Dickens' most spirited poem is *The Ivy:*

Oh, a dainty plant is the ivy green,
That creepeth o'er ruins old!
Of right choice food are his meals, I ween,
In his cell so lone and cold.
Creeping where no life is seen,
A rare old plant is the ivy green.

—Charles Dickens.

J

Jack and Jill, an English nursery rhyme. The story has its origin probably in an old Scandinavian myth. According to this story Jack and Jill were two children whose father compelled them to draw water all day long. They carried the water in a bucket slung upon a pole, the ends of which rested on the children's shoulders. The Moon in pity stole the children that they might be free from their hard labor. To this day their figures may be seen in the moon and are pointed out by the Scandinavian peasants to the little folks as we point out the man in the moon. The English rhyme has undergone many changes, but the two children and the pail of water remain a part of it.

Jack Frost, in nursery lore, the personification of the frost. Jack Frost is a mischievous boy who unexpectedly bites children's noses, pinches their cheeks, and makes their fingers tingle. Jack Frost paints the window panes with beautiful pictures, he freezes the lakes and rivers, and will often break a water pitcher or a glass if it is left where he can get at it. In winter Jack bursts the hard shells of buried nuts, so that the green leaves can peep forth.

Jack Horner, the hero of an old nursery song. The story goes that a man named Horner was sent to Henry VIII with a packet of deeds of certain manors involved in the dissolution of monasteries. Horner presented his packet to the king, but not until he had "put in his thumb" and "pulled out" the deeds of the manors of Wells.

Jack-in-the-Pulpit, or **Indian Turnip,** a woodland herb closely related to the calla. It is found from Nova Scotia to Florida and east Kansas. The last leaf on the flower stalk widens into a broad blade that curves in a protecting green hood over the flower, making the "pulpit" or spathe. A wrinkled, turnip-shaped corm confers the name of Indian turnip. The green spadix standing in the spathe gives the children's name which the poet has well expressed:

Jack-in-the-Pulpit
  Preaches today,
Under the green trees
  Just over the way.
Green is his surplice,
  Green are his bands;
In his queer little pulpit
  The little priest stands.

Jack-o'-Lantern, a lantern carried by children, especially after nightfall Hallowe'en. It is made from a pumpkin by cutting holes to represent a mouth, nose, and eyes. A candle placed within gives a peculiarly weird light. The name is also applied to the Will-o'-the-wisp, or ignis fatuus. See IGNIS FATUUS.

Jack Sprat, a nursery rhyme. This rhyme has been in existence for 250 years. Its form has been changed somewhat in that time. The version of 1659 reads:

Archdeacon Pratt would eat no fat,
  His wife would eat no lean:
'Twixt Archdeacon Pratt and Joan his wife,
  The meat was eat up clean.

Jack the Giant Killer, the hero of an English nursery tale, a great favorite with little folks. It is told in many ways. The story came probably from France. It is found in Walter Map's book which dates from the twelfth century. Geoffrey of Monmouth translated the story into Latin.

Jackal, jăk'al, a wild dog inhabiting parts of Asia and Africa. It is a tawny, ill-scented, noisy, thievish, fox-like animal, having a long, sharp nose and a bushy tail. It hides in the daytime and prowls about in packs at night, with a proclivity for seizing unguarded kids and poultry. But in the vicinity of villages, at least, it depends chiefly on the leavings of vultures and hyenas. When the latter are feasting on the dead carcass of a goat, a camel, or a horse, the jackals sit around in a ring at a respectful distance, waiting to gnaw the bones. In a state of complete wildness, the jackal pack runs down small game or follows the nobler animals of prey, particularly the lion, in hopes of getting a bone, at least, from the king's table. From a mistaken notion that the jackals hunt up game and drive it toward the lion, they have been called the lion's providers. The jackal is comparable to the coyote of the plains. In the ostrich-raising districts of Africa the jackal is to the ostrich farmer what the coy-

ote is to the sheep raiser of Montana. A standing bounty of about $1.75 is offered for jackal tails. It is a proverbially cunning animal. In Oriental tales it takes the place of the fox. It is the "Br'er Fox" of the Arab. See HYENA.

Jackdaw, a bird of the crow family. It is somewhat smaller than the crow and rook. It has black legs, a black body, and a dark gray neck. It abounds in the Mediterranean countries and northward. In a wild country it builds its nests in crevices of cliffs and inaccessible places. In England it is a familiar bird about ruins and rambling houses. It often builds in chimneys which at times it half fills with sticks before it gets a basis for a nest. It is stated that a pair of jackdaws working seventeen days once built a pile of sticks ten feet high in the stairway of a school building at Eton. The jackdaw is tamed easily. It makes a mischievous, noisy, thievish, imitative pet. See RAVEN; CROW; MAGPIE.

Jackrabbit. See HARE.

Jackson, Andrew (1767-1845), seventh president of the United States. He was born March 15, 1767, in the Waxhaw Settlement, near the border of the two Carolinas, and died June 8, 1845, at his home, the Hermitage, near Nashville, Tennessee. He called himself a native of South Carolina, but James Parton has shown that the Jackson cabin stood a quarter of a mile within the north Carolina border. He had little education. At the age of thirteen he joined the Continental army to expel Cornwallis from the state. At the close of the Revolutionary War he entered an office and read a little law. He was naturally a rollicking, bold spirit, well fitted to lead frontiersmen in politics and in war. He was a man of hasty temper. He fought several duels and killed one man. He settled in western Carolina, now the state of Tennessee. In 1796 he was sent to Congress as the representative of the new state. He opposed Washington's administration, and was one of the few who refused to vote for a resolution of commendation on the latter's retirement from the presidency. Tennessee sent him back to the Senate, then made him a judge of the state supreme court. He engaged in planting; but when the war of 1812 broke out he led the Tennessee militia against the Creeks who were favoring the British side. The Indians called him "Sharp Knife" and "Pointed Arrow." His soldiers called him "Old Hickory." Near the close of the war, he was sent to the Gulf. He defeated the British at Mobile and captured Pensacola. He then marched to New Orleans, which he proceeded to fortify by constructing rifle works from the Mississippi River eastward to an inlet of the Gulf. He distributed his force of mountaineers skillfully and ordered them not to fire until they could see the white of the enemy's eyes. General Pakenham, the British commander, attacked with 12,000 troops, but was repulsed with a loss of 2,600 men. Jackson, behind breastworks, lost but eight. The battle was fought Jan. 8, 1815, fifteen days after the treaty of peace had been signed; but it made Jackson none the less a popular hero.

In 1824 he was a candidate for the presidency against Adams, Crawford, and Clay. There being no majority in the College of Electors, the election went to the House of Representatives where Adams was chosen. Jackson's friends were much embittered because Henry Clay, one of the candidates, was made secretary of state. Four years later Jackson was again a candidate, and was this time successful. The party cry was raised, "To the victors belong the spoils." Jackson's predecessors in office had removed but seventy-four officeholders. Jackson removed 690 Federalists in order to make room for his own supporters. One of the important measures of Jackson's administration was his refusal to extend the charter of the United States Bank. Jackson ordered a removal of the national funds, $10,000,000, from this institution, thus helping to bring on a financial panic in the next administration. He was an honest, patriotic, inflexible, passionate man. He had great confidence in the common people, and a distrust of the bankers and the merchant class, particularly the New Englanders, which amounted well nigh to hatred. He was not a well informed man, but he had an iron will, and may very possibly have accomplished what a man of more liberal education would have failed to do.

See SEMINOLES; CREEKS; CALHOUN; CIVIL SERVICE; TENNESSEE; PRESIDENT.

Jackson, Helen Hunt (1831-1885), an American writer. Her maiden name was Helen Fiske. She was born at Amherst, and died at San Francisco. In 1853 she married Captain Edward Hunt, with whom she traveled extensively in the West, gathering the material afterward used in her stories and poems. In 1863 Captain Hunt died. Her second husband, W. S. Jackson, was a banker. She adopted "H. H." as a pen name. She interested herself in the cause of the Indians. *A Century of Dishonor,* appearing in 1881, was a sharp rap on the United States government for not taking better care of the natives. In 1884 her best story, *Ramona,* appeared. The scene is laid in California. It has been called "The Uncle Tom's Cabin" of the Indians. It was intended by the writer to attract public attention to the injustice suffered by the Indians. It won fame for the writer and still ranks as one of the greater American tales. She wrote several other novels and made many contributions to periodicals; but *Ramona* and a number of lovely lyrics are her title to fame. Some of the latter, as *September* and *October,* are sure to be found in every volume of children's verse. See FICTION.

Jackson, Thomas Jonathan (1824-1863), an American soldier. He was a native of Virginia. His parents were of Scotch-Irish stock. Young Thomas was left an orphan at the age of three. Learning when a young man that his congressman had a cadetship at West Point at his disposal, he set out on foot to request it. He appeared at Washington clad in a suit of homespun, carrying his belongings in a pair of saddle bags on his back. He was dirty, foot-sore, and hungry, and very poorly prepared to enter the school. His pluck appealed to the congressman, however, and he was appointed. He was a hard student and fought his way upward. His class contained an unusual number of brilliant students, including McClellan, Gibbon, Pickett, Maury, and others. The professors declared that, if the course had been a year or two longer, Jackson would have been very near the head, if not at the head of his class.

He won a reputation in the Mexican War. In 1851 he became a professor in the Virginia military school instituted at Lexington, but he was never successful as an instructor. He was a slaveholder and a warm friend of the negro. Each Sunday he used to gather his slaves together for instruction in Bible history. When the war broke out Jackson was opposed to secession, yet went with his state. He was one of the ablest soldiers developed by the war and became General Lee's right hand man. In the first battle of Bull Run his command was noted for its steadiness. One of his brother officers made the remark, "There stands Jackson like a stone wall." He was known ever afterward as "Stonewall" Jackson.

In 1862 he conducted the famous Shenandoah Valley campaign in Virginia, and was made a lieutenant-general. He was with Lee at Fredericksburg. While returning from reconnoitering at the battle of Chancellorsville, his party was fired upon by mistake by his own men. He fell wounded, and died May 10, 1863. During the campaign he rode a famous raw-boned sorrel that was unable to "run except toward the enemy." He was such a favorite with the troops that his whereabouts could be told by the heartiness of the cheers which greeted him wherever he appeared. North and South unite in remembering Stonewall Jackson as a man of integrity and ability on whose name there is no stain. In 1905 President Roosevelt gave pleasure to the entire nation by the appointment of Stonewall Jackson Christian, a grandson and namesake of the general, to a cadetship at West Point.

We see him now—the old slouched hat,
Cocked o'er his eye askew;
The shrewd, dry smile, the speech so pat,
So calm, so blunt, so true,
The "Blue Light Elder" know 'em well;
Says he, "that's Banks—he 's fond of shell,
Lord save his soul! we'll give him—"Well,
That's Stonewall Jackson's way.

Silence! ground arms! kneel all! caps off
Old Blue Light 's going to pray.
Strangle the fool that dares to scoff!
Attention! It's his way.
Appealing from his native sod
In *forma pauperis* to God—
"Lay bare thine arm, stretch forth thy rod:
Amen!" that 's Stonewall's way.

He 's in the saddle now. "Fall in!
Steady the whole brigade!

Hill 's at the ford, cut off—we'll win
His way out, ball and blade!"
What matter if our shoes are worn?
What matter if our feet are torn?
"Quick-step, we're with him before dawn!"
That 's Stonewall Jackson's way!
—John Williamson Palmer.

Jackson, Michigan, a manufacturing city on the Grand River. The city is on several important railroads, the Michigan Central having large car and machine shops there. Some of the leading manufactures are agricultural implements, wagons and carriages, machine-shop and foundry products, corsets, paper, flour, sewer-pipe, and bricks. It has a large trade with the outlying agricultural districts, and is a distributing point for farm machinery. The city has a municipal waterworks system, well-paved streets, and a number of handsome county and public buildings. The population in 1920 was 48,374.

Jackson, the capital of Mississippi. It is located on the Pearl River, near the center of the state and in an agricultural region. Several railroads and good water connection furnish avenues of traffic for the cotton which is its chief export. The leading manufactures are cottonseed oil, fertilizers, woodwork, bricks, farm machinery, brooms, and foundry products. Two colleges are located there, Belhaven College for women, and Millcaps College, a Methodist Episcopal school. A number of the state institutions are located there, besides the handsome state buildings. In 1863 General Grant held the city, and the next year it was almost destroyed by General Sherman. The population in 1920 was 22,817.

Jacksonville, a port of northeastern Florida. Though situated twenty-two miles inland on the St. Johns River it is really a seaport, for large ocean steamers come up the river to the city. It has an important trade with other Atlantic ports in oranges, pineapples, cotton, yellow pine lumber, fertilizers, kaolin, garden produce, and naval stores such as rosin and turpentine. It has an advantageous position commercially and commands most of the inland trade of the state. There are 200 or more manufactories of various kinds. The only ostrich farm in the United States east of the Mississippi is located in a suburb. The pleasant climate and the fact that the city is known as the "Gateway to Florida" and to the East Coast winter resorts, combine to make the city a great resort for tourists. The Florida East Coast Railway, among several others has its terminus in the city. In 1920 the population was 91,558.

Jacksonville, Ill., the county seat of Morgan County, and a manufacturing city of note, is 93 miles north of St. Louis, Mo., on four railroads. This city has also attained popularity as the seat of many educational institutions, including Illinois College, with which the Illinois Conservatory of Music is connected, the Illinois Woman's College, Roult College, Whipple Academy and fine graded schools. Important among her manufactures are steel bridges, men's clothing, cigars, candy, bricks and novelty fixtures for department stores. It was in Jacksonville that Stephen A. Douglas began his law practice. Population, in 1920, 15,713.

Jackstones, a game played by one or more persons with from one to five small pebbles or bits of iron. Regular iron jackstones have six knobbed prongs. The game may be played in several ways. There is tossing and catching in all of them. The five stones may be held in the palm of the hand and thrown up together and caught on the back of the hand. The jack may be tossed up and caught alternately on the palm and the back of the hand, the player counting five for each successful catch. The player who reaches the highest score wins. Sometimes four stones are laid on the ground. The player tosses the jack and catches it, picking up a stone from the ground each time, while the jack is in the air. This method may be varied by holding the four stones in the hand and laying one on the ground between each toss and catch. Sometimes the jackstones are laid in a pile. The player arranges them in a figure, as the four corners of a square or in a straight line, this between tosses.

Jackstraws, a familiar parlor game. It is played with straws or with strips of bamboo, wood, ivory, bone, or the like. The straws are tumbled in a confused heap

on a table. The players take turns. The first withdraws straws, one at a time, as long as he can do so without joggling the heap or moving any other straw. The right to play then passes to the next. The player who has the most straws at the conclusion of the game wins.

The pieces may be withdrawn with the finger or angled for with a hook provided for the purpose.

Jacob. See ISRAEL.

Jacob's Ladder, a familiar garden plant of the phlox family. The stem is erect, from one to three feet high. The name is derived from the regular order in which nine to twenty-one leaflets are arranged on the long leaf stem. The stamens and style are exserted beyond a bright blue, bell-shaped corolla. In the northeastern part of the United States, the species is found wild only on mountains and in swamps, but it is abundant in the meadows of the Rocky Mountains and far northward. Called also Charity.

Jac'obin, a name applied to a revolutionary club of France, and later to the party favoring democracy. When the National Assembly first met in Versailles, Lafayette, Mirabeau, and a few other Liberals formed a society known as the Friends of the Constitution. After the assembly removed to Paris, the name was changed to Jacobin club, because of their meeting in the library of the church of St. James. After the removal to Paris, the character of the club changed rapidly, the moderates dropped out, the number of members increased, and the name became synonymous with the party of extreme democracy. Daughter societies were formed throughout France, dependent on the mother club at Paris. At first the Jacobins had little influence in the assemblies though they were all powerful with the mob, but as the Revolution progressed they became more and more dominant. The Jacobins directed the attack upon the Tuilleries in 1792; they initiated the September massacres; they were the ones who insisted that Louis must die. Later when France was beset by foreign war and internal disaffection, the Jacobins instituted the Terror, which, hideous as it was, seemed a necessary evil at this time. Cruel as the Jacobin policy often was, it forms a striking contrast to the wavering vacillation of the Girondists. Every one rejoiced when in 1794 the Jacobin organization was finally suppressed after the repulsion of the foreign dangers and the downfall of Robespierre, yet it is difficult to see how otherwise the same results could have been accomplished. As Lowell says,

> "They did as they were taught, not theirs the blame
> If those who scattered fire brands reaped the flame."

See FRENCH REVOLUTION.

Jacobites, in English history, adherents of the Stuart family, more particularly followers of James II. The name is from *Jacobus,* Latin for James. At the time of the English revolution in 1688 the Catholics, save those influenced by political expectations, adhered to the cause of James II. In Ireland they were defeated decisively at the Battle of the Boyne, July 1, 1690. The French court was their rallying center. The Highland Jacobites rose twice, first in 1715 and again in 1745. The Jacobites faded away gradually. In the reign of George III they became ardent supporters of the royal authority, and contributed not a little to that monarch's obstinacy in dealing with his American colonies. Scottish Jacobite songs form a part of the national literature. See BOYNE; STUART; MACDONALD, FLORA.

Jacquard, Joseph Marie (1752-1834), a French weaver, noted as the inventor of the Jacquard loom attachment by which many fancy effects in the weaving of textile fabrics, especially large and elaborate figures such as appear in damask, are produced automatically. Jacquard was the son of a poor silk weaver of Lyons, whom he assisted in his work. On his father's death Jacquard set up a silk factory, which was unsuccessful because the proprietor spent his time in trying to improve the processes in use. After serving as a soldier in the Revolution Jacquard returned to Lyons. His first invention was a loom for the weaving of nets, which he was led to make by reading in an English newspaper that a prize had been offered by the Society of Arts for such a machine. Jacquard made no attempt to obtain the prize, but the fact of his invention became known. He was sent

to Paris, where Bonaparte advanced the means to continue his experiments.

In 1801 Jacquard exhibited a loom for weaving figured silk. The weavers of Lyons, thinking their bread and butter endangered by the new machine, mobbed the inventor and broke up his invention. Jacquard describes the occurrence himself. "The iron was sold for old iron, the wood for kindling, while I was delivered over to universal ignominy." After a long struggle against prejudice, ignorance, and poverty, Jacquard sold his rights to the French government and ended his days in comfort. Before his death he had the gratification of seeing his invention in extensive use throughout the textile manufacturing districts of Europe and America. In 1840 a statue was erected in Lyons to Jacquard's memory on the very spot where his loom had been destroyed.

The Jacquard attachment may be applied to almost any loom. It is regarded as the most important apparatus ever adapted to weaving since it makes possible the automatic production of all varieties of pattern weaving. It involves many fine mechanical details, but if the action of the ordinary loom is understood, the fundamental principle of the "Jacquard" is comparatively simple. The purpose of the appliance is to make possible the raising of each warp thread independently of the others. It will be seen that, in producing a pattern in a fabric of one color, the warp threads, instead of being raised and lowered in two sets, as in plain weaving, must be raised and lowered in such numbers and at such intervals as will produce the pattern indicated. That is, the figure in any particular design must appear in parallel threads on a ground of threads running at right angles or obliquely to the thread of the figure. In the Jacquard appliances a wire is attached to each warp thread. Each wire passes through a horizontal needle, and, above this, is hooked to a lifting bar. The needles meet a perforated cylinder and pass through the perforations, and, if there were nothing more, the warp threads would all be lifted with the action of the loom; but this cylinder bears a series of cards, hooked together at the corners and moving as an endless chain. These cards are perforated according to the pattern to be worked out, some of the needles, therefore, meeting perforations which correspond to those in the cylinder, act as usual. Others meet the cards where they are not perforated and are driven back in such a manner as to detach their particular wires from the lifting bar, and the warp threads attached to these wires are not lifted.

It will be seen that the preparation of these perforated cards is the really slow and difficult part of the process. A new set must be prepared for each new pattern. Sometimes several weeks are occupied in the preparation of cards for a new design. A single piece of silk damask exhibited at the Chicago World's Fair by the Philadelphia Textile School required 28,320 cards to form the design. These cards, if placed end to end, would extend a distance of seven and a quarter miles.

See DAMASK; WEAVING.

Jacquard Loom, or Jacquard Attachment. See JACQUARD, JOSEPH MARIE.

Jade, a name given to two minerals of different composition but having in common the qualities of toughness and compactness which makes them susceptible of being easily carved. One of these minerals is nephrite, a variety of hornblende. It is found in white and in various shades of green. The other is jadeite, a silicate of aluminum and sodium. This is much the handsomer of the two. It is translucent, and is found in shades from creamy white to delicate green.

Jade was used by pre-historic races for ornaments, weapons, and various utensils, specimens of which have been found among the relics of the lake-dwellers of Switzerland, and of other primitive peoples. It is believed that the jade was brought to Europe, however, as it is not found native to that country, but in the Far East. The best-known locality for jade is eastern Turkestan. The Chinese and Japanese use it largely for carved vases and bowls, for boxes and for various kinds of jewelry. They also use it in making implements.

The word jade is from the Spanish and is part of a phrase meaning "stone of the side," so named because of a belief that this mineral would cure pain in the side, or colic.

Jaguar, jăg′wär, a formidable, catlike animal closely related to the panther or cougar. Its native range extends from Texas to Paraguay. It has a heavy body about four feet in length, the total length, including the tail, being two feet greater. It is spotted like a leopard. In temperament and habits it is not unlike the cougar. The *Century Dictionary* figures the jaguar with a capybara or river hare in its claws. It occupies a wide range of territory. It lives in forests, where it climbs trees and springs upon the deer, tapir, and agouti, and it is found in treeless uplands as well. See COUGAR.

Jahn, Friedrich Ludwig (1778-1852), the founder of organizations for physical training in Germany. He was a native of the province of Brandenburg. He studied at various universities, developing an ardent patriotism as his strongest characteristic. He became possessed with the idea that national spirit could be and must be fostered by the physical development of the young. To this end he established in 1811 a turnplatz, or open-air gymnasium at Berlin, and began organizing turnvereins, that is, "exercise societies." After considerable opposition he won the favor of Emperor William Frederich III, which was, of course, a great help in the propagation of his ideas. Jahn served in the war of the Allies against the French, 1813-15, and then returned to his chosen work. Unfortunately he fell under the suspicion of the reactionary government and, after a short imprisonment, was forced to leave Berlin, and forbidden to live in any university town, since it was his influence upon youth that was feared. But Jahn was in earnest and although restricted in furthering his plans he began to write on the subject, and his publications were of influence in keeping alive the interest he had awakened. Turnvereins became numerous and it is acknowledged generally that their influence in developing a feeling of national unity was, measurably at least, what their founder had hoped it would be. Jahn is called frequently "turnvater," that is the "father of gymnastics."

Jalap, jăl′ap, a plant of the morning glory family found originally on the table lands of Mexico, in the neighborhood of the town of Jalapa. The root, which is turnip-shaped and has a milky juice, is dried and exported as the jalap of commerce. Jalap is a powerful medicine and is administered either as a tincture or in the shape of a powder made by grinding the root. It is chiefly used as a purgative. It is a valuable remedy, especially in certain cases of dropsy. See MEDICINE.

Jamaica, jā-mā′ka, the largest of the British West India Islands. It lies ninety miles south of Cuba. Length, 150 miles; breadth, fifty. A range of mountains runs from east to west. The highest peak is 7,400 feet above sea level. The name Jamaica is Indian, meaning a "Land of Springs." A limestone plateau occupying the center and west is full of fertile "cockpits" or sinkholes. One of these is ten miles in diameter. The limestone is carved and dissolved by tropical rains. Many streams find their way to the sea under ground. There are numerous limestone caverns containing Indian antiquities.

The climate is tropical and equable. Frost is unknown. At sea level the temperature rarely falls below 75°. At Kingston the limits are 70° and 88° Fahrenheit. The interior is higher and cooler. The greater the height, the lower the temperature. The temperature on the plateau varies only from 67° F. to 75° F., a variation of nine degrees. The average rainfall is sixty-six inches. The area of the island is 4,207 square miles. There are 302,500 acres under tillage: 772,580 under pasture. The chief exports are bananas, oranges, sugar, pimento, dogwood, and cacao. Jamaica rum, ginger, and coffee are famous. Cassava and cotton are produced. Tobacco grows fairly well, but does not rival that of Cuba. In 1607 Hans Sloane visited Jamaica and collected no less than 800 plants then new to science. The island is rich in ferns.

Jamaica was settled by the Spaniards in 1509. It was wrested from them in 1655 by a force sent by Cromwell, since which time it has remained in the hands of the British. The population in 1921 was reported at 857,921, of which the whites number but 16,000. The rest are negroes and mulattoes, with a few thousand coolies and

Chinese. The negroes are the descendants of former slaves.

The island is ruled wisely by a resident British governor and a council of twenty-nine members. The governor has a salary of $25,000 a year. Kingston, a city of 57,400 people, is the capital. There are 197 miles of railway; 2,168 of telegraph; and numerous telephone lines. The legal money is British, but American coins are current. There are about 700 schools with 92,176 children in attendance. There are three normal schools, as well as a number of high schools and industrial schools.

James I (1566-1625), king of England, and VI of Scotland. He was the only child of Mary, Queen of Scots. His father was Mary's second husband, Henry Stuart, Lord Darnley. He was born at Edinburgh Castle in 1566. He was crowned at Stirling the following year. During his childhood the kingdom was managed by factions. He was educated by George Buchanan, the greatest classical student of the age. When he came of age he allied himself with Elizabeth of England, and is believed, despite some show of intercession, to have been callous to his mother's long imprisonment and execution. In 1603, at the death of Elizabeth, he inherited the crown of England and transferred his court to London. The king's pedantry and cowardice, his subjection to favorites, and the crowd of needy Scots who followed him to London are described by a masterly hand in Scott's *Fortunes of Nigel.* This is the king James whose name is connected with the translation of the standard English Bible, and in whose reign Jamestown and Plymouth were founded, and Sir Walter Raleigh beheaded. He was a true Stuart in the assertion of the "divine right of kings" to rule. He died in 1625. While naturally the subject of flattery, it is safe to assert that he was feared, loved and respected neither at home nor abroad. See GUNPOWDER PLOT; PILGRIMS; RALEIGH.

James II (1633-1701), king of England, grandson of James I. He was the son of Charles I and the brother of Charles II. Like his brother whom he succeeded, James was a Catholic and clung to the fatal Stuart theory that the king ruled by divine appointment and was superior to his people. He came to the throne in 1685. He was driven out of England in 1688 and died in exile at Paris in 1701. His short reign of three years was filled with contentions with a Protestant Parliament, an intriguing Protestant nobility, and a Protestant clergy. He accepted funds from France and strove to restore the Church of England to the fold of Rome. A rebellion led by the unfortunate Duke of Monmouth was put down, as it should have been; but an infamous judge—one Jeffreys—held court, the sittings of which were known as the Bloody Assizes, in the path of the rebellion and executed over 300 victims with little formality of law. In 1688 James was forced to flee to France. He was succeeded by his eldest daughter, Mary, and her husband, William, Prince of Orange. The event is known as the English Revolution.

See STUART; BOYNE; JACOBITES.

James V (1512-1542), king of Scotland. He was the son of James IV. He married Mary of Lorraine, daughter of the Duke of Guise. Their daughter was the famous Mary, Queen of Scots. James became involved in a war with England and was defeated at the battle of Solway Moss, in which he received a wound that proved mortal. Mary was but seven days old when her father died. See MARY, QUEEN OF SCOTS.

James, Henry (1843-1916), an American novelist and critic, a leader in what is known as the realistic school of fiction. He is the son of Henry James, the theologian and philosopher. The younger man received the greater part of his education in Europe, although he studied law at Harvard. Since 1869 he has lived for the most part in England and Italy. Partly on this account, and partly because he is given to showing up the faults of his countrymen, he has been accused of lack of patriotism. He is sometimes called our "international novelist." His characters are often Americans in Europe. He began his work as a writer with contributions to the American magazines. *Daisy Miller,* published in 1878, brought him into prominent notice. Other novels are *Watch and Ward, The Bostonians, The Americans, The Portrait of a Lady, The Tragic Muse, What Maisie Knew,* and *The Europeans.* He has written many short stories which have been col-

lected and published in book form. James is a keen analyst of character and motive. His work is finished and complete to the minutest detail. Although he has produced more than fifty books, he is never careless; his style gives no hint of haste. James' *French Poets and Novelists* and a *Life of Hawthorne* show that he is possessed of skill as a critic. James' thrusts are keen. He is a writer for the few.

James, William (1842-1910), an American philosopher. He was the son of Henry James the theologian, and brother of Henry James the novelist. He was born in New York City. As a boy he attended private schools, and studied with tutors at home and abroad until nineteen years of age, when he entered the Lawrence Scientific School of Harvard University. In 1870 he was graduated from Harvard medical school, and two years later was appointed instructor of anatomy and physiology at that institution. In 1876 he was made assistant professor of physiology, later assistant professor of philosophy and in 1889 Harvard created for him a new chair of psychology. The following year Professor James published *Principles of Psychology* which at once became, and has remained a standard text-book on that subject. In 1884 James helped to found the American Society for Psychical Research, in the work of which he took a keen interest. In 1897 he was, at his own request, transferred to the chair of philosophy. The same year he published *The Will to Believe,* followed shortly by *Human Immortality, Talks to Teachers and to Students,* and *Varieties of Religious Experience.* Other works are *Pragmatism, A Pluralistic Universe,* and the *Meaning of Truth.* As a writer James is clear and direct, his fine imagination aiding him to make even abstruse subjects human enough to be readable. He takes high rank among philosophical writers. As a teacher and lecturer he was immensely popular. Thousands of his students are ready to declare him the most able teacher Harvard has ever had. As a philosopher he is said to be the first American rightfully so called. It has been said also that his writings stand like a landmark in the history of human thought. Heretofore, the ordinary individual had regarded philosophy as something far removed from the ken of practical men engaged in everyday pursuits. James has popularized it, has shown that it has or may have an interest for all. This has come about chiefly through his lectures on *Pragmatism,* published in 1907 with the subtitle of *A New Name for Some Old Ways of Thinking.* Soon everyone was talking of and reading about pragmatism, and as James himself said the word "fairly spotted the pages of the philosophic journals." Neither word nor idea originated with Professor James; he acted rather as interpreter to the many, of methods with which Socrates and Aristotle, Locke, Berkeley, Hume and many others had been familiar. Just as modern methods and theories have made religion as much the concern of the layman as of the priest, so the method and theory of pragmatism may make philosophy the concern not alone of the philosopher, but of every one. To attempt a definition, pragmatism is a method of solving philosophic questions by looking forward to results instead of looking back to causes, a method of regarding only the effects of a conception as of significance. In other words, it is the application of the same test to every suggested hypothesis in the search for truth, that one would apply if he were searching for an efficient tool: "Does it work?" The pragmatist casts aside without consideration all questions the settling of which, by this answer or by that, can make no real difference in man's life and conduct. He has to think only of such things, and to decide only such questions as will have real consequences. "The ultimate test of what a truth means is indeed the conduct it dictates or inspires."

Open-mindedness is one of the essential characteristics of the pragmatist. He discards, it is true, many abstruse questions over which philosophers have puzzled for ages, but no thought, no idea, no notion is too small, or too ridiculous for him to consider, and to apply to it his test: "what would be the actual effect of this thought, this idea, or this notion, were it true?" The pragmatist can never say "it matters not what a man believes." To his view the all important thing is what one believes, for his beliefs control his actions. Charles

Peirce said thirty years ago, "The whole function of thought is to produce habits of action."

So much for pragmatism as a method, but it is still more, it is a theory of truth. The pragmatist denies that truth is absolute. An idea may have seemed true once, to certain individuals may have stood the pragmatist's test, but to others it may be false. To the ancients the idea of a flat world was truth; to us a flat world is inconceivable. It is by our experiences that ideas become true or false. To the words wealth, health, strength, James adds the word truth, declaring it is to be exactly similar, "truth is made just as health, wealth, and strength are made, in the course of experience." Thus man is not a helpless victim of fate, but is able to influence realities, able to help make truth, and pragmatism, aiming not to solve the riddle of the universe, becomes but a tool, an instrument with which to do our work. This work itself must loom ever larger and grander and more important to him who has accepted the theory and adopted the method of pragmatism.

Said of James:

He talked to his classes as man to man, urbane, gracious, witty and withal vastly learned. —John Macy.

Like Plato he was at once profound and palatable.—*The Outlook.*

A rare spirit was his that has left the world far richer for its presence.—H. Addington Bruce.

Professor James was really a turning point in the history of our time.—G. K. Chesterton.

Jameson, jā'me-son, **Mrs. Anna Brownell Murphy** (1794-1860), a British author and art critic. She was born at Dublin, the eldest daughter of an Irish miniature painter. While a young woman she filled the position of governess in several families, and in 1825 married Robert Jameson, from whom she soon separated. Her first publication was *Diary of an Ennuyeé* which appeared in 1826. *Loves of the Poets, Memoirs of Female Sovereigns,* and *Characteristics of Shakespeare's Women* soon followed. These books were favorably received, but Mrs. Jameson is known best for her art criticisms. Among her writings in this line may be mentioned *Handbook to the Public Picture Galleries of Art,* published in 1842; *Memoirs of the Early Italian Painters,* and *Sacred and Legendary Art.* These works have done much toward the refinement of public taste, since they are of such style as to attract the ordinary reader and are at the same time true expositions of the works of the old masters.

Jameson Raid, the notorious invasion of the Transvaal by Dr. Leander Starr Jameson. In 1895 Dr. Jameson who was then administrator of Rhodesia, was placed in command of a body of troops by Cecil Rhodes, at that time premier at the Cape, and sent to the border of the Transvaal. There was discontent and political agitation among the foreign population there and Jameson had orders to act in case of disturbance. Acting, however, on his own judgment he invaded the Transvaal without cause, and was defeated and taken prisoner by the Boers. He was surrendered to the English authorities and ultimately was sentenced to imprisonment. The unjustified invasion of the Transvaal aroused much general sympathy in behalf of the Boers.

James River. See JAMESTOWN.

Jamestown, N. Y., an industrial city, is on the outlet of Chautauqua Lake, 70 miles southwest of Buffalo. It is served by two steam roads, and electric railways connect it with all important surrounding cities. The chief products of its factories are wood furniture, metal furniture, photographic paper, towels, worsted goods, washing machines, window screens, voting machines and plate glass. There is a fine high school, three junior high schools, graded schools, James Prendergast Free Library, many fine churches, two hospitals, Y. M. C. A., Y. W. C. A. and the Agnes Home for Working Girls. The city is popular with summer tourists, owing to the beautiful resorts on Lake Chautauqua. It had a population of 38,917 in 1920.

Jamestown, Virginia, the first permanent English settlement in America. It was colonized May 13, 1607, by a party which included Gosnold and John Smith. The location chosen was a peninsula on the river James, about thirty-two miles above its mouth. The town passed through the vicissitudes of famine, fire, and Indian massacre, but was never abandoned wholly. During early colonial days Jamestown was

not only the capital of Virginia, but a center of fashion and gaiety. In 1698 the capital was removed to Williamsburg. The site of Jamestown was not happily chosen. It was low and malarious. The neck of the peninsula, always under water in time of flood, has been washed wholly away, converting the old site into an island. The water frontage has been undermined by the current. The spot where the old historic cabins stood has gone down stream, but the ivy-mantled tower of an old brick church and several tombstones still stand. With assistance from the general government, an association for the preservation of Virginian antiquities has purchased the spot and has built a retaining wall to prevent the further encroachment of the waves. See VIRGINIA; SMITH, CAPTAIN JOHN.

Jamestown Exposition an historical and industrial exhibit held in Jamestown, Va., in 1907, to commemorate the three-hundredth anniversary of the first English settlement in America. The educational phase of the exposition was noteworthy, for only such features of educational work were illustrated as were unique in plan or result. While the Jamestown Exposition was not to be compared in point of size with the one at St. Louis four years before, it demonstrated clearly that a smaller, more intensive and less spectacular display may have a greater educational effect.

Janesville, Wis., the county seat of Rock County, is situated on the Rock River, 79 miles west by south of Milwaukee. It is in the center of a rich agricultural district, and is served by the Chicago & Northwestern, and the Chicago, Milwaukee & St. Paul railroads. The Rock River gives power to the city's factories, which produce cotton and woolen goods, boots and shoes, furniture, wagons, fountain pens, barbed wire and nails. The quantity and quality of the tobacco grown near Janesville are especially notable, and a large trade is carried on in this article, and in sugar beets and wheat. Prominent among the city's buildings are the Federal building, the Y. M. C. A., the city hall and the public library. Population in 1920, 18,293.

January, the first month of the year. The old Roman year began with March. The beginning of the year was shifted to January about 251 B. C., but this arrangement was not accepted by Christian nations until the eighteenth century. The Jewish New Year still falls on March 25th. The month was named in honor of Janus, the god of doors, gates, and all passageways. He was represented in art as a god with two faces, one looking backward, the other forward. New Year's Day was the chief festival in his honor. Presents were then made. The Temple of Janus in Rome was open in time of war. It is said to have been closed but three times in 700 years.

Janus, jā′nŭs, in Roman mythology, an important deity, second only to Jupiter himself. He was regarded as the author of the arts of civilization and was believed to sit at the confines of the earth and at the gates of heaven and to be the special guardian of the beginning and the ending of every undertaking. He was thus the god of the rising and of the setting sun. To him was ascribed the system of the years and the change of seasons. The month of January was named for him and his festival was observed on New Year's Day. He was invoked every morning, since fortune and misfortune were in his hands. As the guardian of doorways and gates, he is represented in art as two-faced, one face looking eastward, the other westward. In his right hand he holds a scepter and in his left a key. The doors of the temple of Janus in Rome were left open in time of war; in time of peace they were closed with much ceremony and great rejoicing.

Japan, an empire of eastern Asia. It comprises chiefly a chain of four large continental islands inclosing the sea of Japan. Hondo or Nippon, the largest of these, is from fifty to 100 miles in width, and about 700 miles long. There are in all no less than 487 islands of sufficient size to be recognized by the government. The area of the empire, including several groups of small islands, as well as Formosa, is 147,655 square miles, about equal to the combined areas of Minnesota and Wisconsin. The larger islands have numerous deep-water harbors. A mountain chain runs lengthwise through Hondo. The highest peak, Fusiyama, lies about two and one-half miles above sea level. About 200 years

ago an eruption took place. Many people living in the vicinity were killed. It is now a dormant volcano covered with perpetual snow. The people regard the mountain as sacred. Aside from this peak, the rest of the mountain chain is arable. Active volcanoes occur in Yezo, the most northerly of the large islands. During the last twenty years of the eighteenth century a score of villages and 100,000 people were destroyed by volcanic eruptions. An extinct crater in the southernmost of the large islands is said to have the largest circumference of any in the world. Earthquakes are frequent throughout the empire causing the inhabitants to build low houses of light construction.

MINERALS. The fundamental rocks of the islands are of volcanic origin. These are overlaid by clays and marl. There are numerous deposits of a kind of clay used for porcelain. Mines of gold, silver, lead, and iron occur. The tin and copper are of superior quality. Hot springs abound. Coal mines have been opened up of late. Oil wells now produce a large yield of petroleum. The pearls of Japan are famous for their size and beauty. The empire is one of the sources of ambergris. Carnelians, jasper, and agate stones are found.

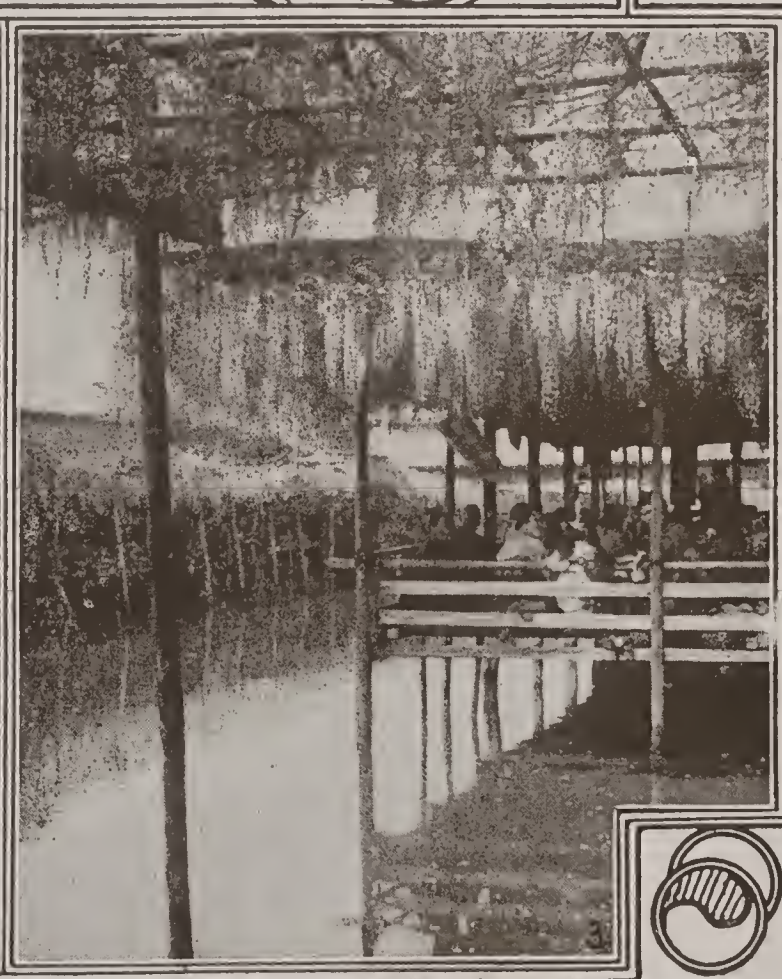
CLIMATE. The Empire extends through so many degrees of latitude that the range of climate is greater than that of the United States. The southern part of Formosa is within the Tropic of Cancer. The most northerly island of the empire, an islet of the Kurile group, lies beyond the fiftieth parallel of north latitude. The climate of the empire is much modified by the Japan Current, producing much the same effect that the Gulf Stream does upon the British Isles. The seasons are much like those in the United States, only warmer. There is abundant rainfall. Typhoons are expected in September.

FLORA. The bamboo and the sago palm flourish as far north as Tokio. The pine, elm, chestnut, beech, and oak are found at the greater elevations, or farther northward. Asa Gray, the American botanist, found that the flora of Japan corresponds very closely to that of North America, yet there are many peculiar plants that we do not have, as the lacquer tree, the wax tree, and the japonica. Some of our most valued vegetables and varieties of orchard fruits have been obtained from Japan. The uplands are clothed with a profusion of wild flowers. The leaves of the maple and other deciduous trees on the hillside turn red with frost in autumn just as ours do. The tea plant thrives best in Central Japan.

FAUNA. Although a long settled country with an ancient civilization, there are still a few wild animals. Wild bears still roam in Yezo. The monkey, deer, boar, and hyena are found in the more remote portions of the main island. Like other folks, the people of Japan have many tales to tell of the quest of the fox and the badger. Though Japan is noted for cats, the islands are infested with rats and mice. The islands are not without birds, but it is said that there are only two song birds, a lark and a nightingale. Large serpents are numerous, but they are harmless. Insect life is abundant and brilliant. Mosquitoes and fleas infest the country.

FISHERIES. A kind of trout much prized by anglers is found in the chief streams. The seas teem with fish. Pearl and coral are gathered. Lobsters and oysters bring the total value of marine products up to about $30,000,000. Three million Japanese subsist by means of the fisheries. This industry was enlarged greatly by the agreement permitting the Japanese to fish in the waters of Russian Siberia. The streams are all comparatively short. The water supply is hoarded carefully for purposes of irrigation. Lakes are not infrequent. One in the southern part of Hondo is over forty miles in length. Flatboats carry the produce of the interior to the seaports. Cedar and pine logs, rivaling those of the Pacific Coast in size, are floated from the mountains to sawmills near the sea.

AGRICULTURE. The soil of Japan has not been praised for natural fertility, but the islands have been brought to a high state of cultivation by the thrift and industry of the people. Four acres is considered a large farm. Each available foot of land is cultivated carefully. Where the hillsides are too steep for the plow, they are terraced and tilled by hand. The smallest scrap of barnyard litter or other material is saved and applied to the land. Even the



SCENES IN NIPPON

1. A Vegetable-Peddler
2. A Japanese Meal, Tokio
3. In the Wistaria Arbors, Kameido District, Tokio

(2 and 3 from Stereographs, copyright by Underwood & Underwood)

1. Pipe. 2. Pipecase and tobacco pouch. 3-4. Hiltguards. 5. Bronze vase from Kioto. 6. Coins. 7. Armorial designs. 8. Sword. 9. Dagger. 10. Lance. 11. Hand basin. 12. Teapot—burnt clay. 13. Chest. 14. Hamper. 15. Masks. 16. Picture of a god. 17-18. Novelties. 19. Painting design. 20. Great bell of Kioto. 21. Stirrup. 22. Pillow. 23. Silk pattern.

JAPANESE ART.

sweepings of the highways are saved with care. The roadways are lined with rows of fruit trees. Rice is cultivated in the south, two crops a year. Sugar-cane, tea, wheat, barley, corn, millet, buckwheat, potatoes, lemons, pumpkins, cucumbers, cotton, and hemp are important productions. Ginger, pepper, and camphor are produced in considerable amounts. Sheep do not do well. Domestic fowls are an important source of food. Horses of a small breed, buffaloes, and zebus are used for transportation and agricultural purposes. There is a public law to the effect that land left uncultivated for more than a year goes back to the state.

MANUFACTURES. Japanese artisans are not only artistic and skillful, but imitative. In many arts, such as lacquering, the manufacture of porcelain, steel mirrors, mulberry paper, paper handkerchiefs and napkins, fans, ivory carving, the casting of metal statues, the weaving of silks, decoration of screens and earthenware, they are unsurpassed. Modern manufactures are springing up rapidly. Native factories now make cannon, firearms, ammunition, and implements of the most approved patterns. Shipyards equipped with the most modern appliances have been established at several ports. Tokio is the capital. Yokohama, eighteen miles distant, is its seaport. There are 14 cities having over 100,000 in population. The leading exports are tea, silk, ornamental articles, drugs, porcelain, matches, paper, and straw braid. The leading imports are flour, sugar, cotton, iron and steel goods, machinery, stationery, and petroleum.

PROGRESS OF JAPAN. Japan was little known to the world prior to 1852, when a naval expedition under Commodore Perry succeeded in making a treaty opening the principal ports to foreign commerce. The only nation previously enjoying the privilege was the Dutch. During the last fifty years Japan has made wonderful progress. Docks have been constructed; railroads have been built; the empire has been thrown open to the world. The young people of the upper classes have been sent abroad to absorb knowledge and learn the ways of the world.

GOVERNMENT. In 1868 the rule of feudal lords was shaken off in favor of the emperor. In 1889 the Japanese exchanged an absolute monarchy for a constitutional form of government. The emperor is called the mikado. He is assisted by a cabinet and a parliament of two houses framed on the British model. The members of the house of representatives are elected by ballot, one for each 120,610 people. Male Japanese subjects not less than twenty-five years old, who are residents of a year's duration and who pay taxes to the amount of not less than five dollars a year, may vote. This sounds fairly reasonable, but the smallness of means is such that thousands pay less and the suffrage is confined to a fraction of the male population.

POPULATION. The Japanese belong to the Mongolian family. They are related to the Chinese, whom they resemble somewhat in appearance.

The total foreign population of Japan in 1920 was only 25,880, of whom by far the greater number, considering the number of nations represented, were Chinese. They numbered 14,258. The next largest group was English, 2,384, closely followed by Americans, 2,036, and Russians 1,232. These figures are very much smaller than the figures for Japanese residents in other countries. In China alone there were 139,888 Japanese men and 85,899 women in 1920.

EDUCATION. Education is now well nigh universal. There are 27,000 elementary schools in the empire, with over 100,000 teachers, and an enrollment of more than 8,000,000 pupils. High schools, normal schools, industrial schools, agricultural schools, and two universities, including departments of law, medicine, engineering, architecture, etc., are maintained. Illiteracy is practically a thing of the past. As in Germany and France, every able-bodied male citizen is liable to be called upon for military service.

INSTITUTIONS AND CUSTOMS. The constitution provides for absolute freedom of religious belief and practice. There is no state religion and no state support. In religious belief the people are much divided. A mild form of ancestor worship prevails. There are twelve sects of so-called Shintoism, and as many of Buddhism. Most of

the upper classes have forsaken the native religions for European forms of belief. Volumes might be written on the peculiar institutions of Japan. The sexes dress much alike, usually in a number of loose gowns, worn one over the other, with large sleeves that serve as pockets in which to carry articles. The dress of the women may be known from that of the men, however, by the brighter colors that prevail. The women of the higher classes use much gold embroidery. Until of late all classes went bareheaded. Parasols were very fashionable. The women dress their hair elaborately, keeping it in place with big tortoise shell combs. All women, regardless of social station, carry fans, with which to screen their faces from the sun. With men the sword is a badge of social standing. The nobles wear two swords, one above the other; the knights, one sword. Men of laboring station are not allowed to carry any. The people are sociable and peaceful, but, like the Chinese, are slaves to long established forms of etiquette. It is ill-bred, not to say impious, to violate rules of behavior. Food is eaten usually out of light lacquered dishes made of papier mache. At great feasts each guest is supposed to be followed by a servant with a basket in which to carry away remnants of fish, game, venison, poultry, etc., that might be left over. There are no chairs, tables, or bedsteads. The floor, matting, and cushions serve instead. Cooking is done over small charcoal stoves. The entire furniture of a prosperous family in a four-room house is worth not to exceed twenty-five dollars. The house itself is of very light bamboo construction. The partitions are mere sliding screens, easily removed. In fine weather the outside walls are taken away during the day.

The people are fond of music and dancing, and of tea drinking. Theaters are popular. Mountebanks and jugglers of all sorts are welcomed by the people everywhere. Women and children toil in the fields. Ladies spend much of their time in making artificial flowers, butterflies, embroidery, and other fancy work. The common people are exceedingly industrious and tractable. They will do anything that they are taught to do. The recent advance of Japan is due very largely to the superior intelligence of the ruling classes, whose servants the common people are. In this respect the great public works and even success in warfare bear a certain similarity to the successes of the ancient Egyptians. The hour of Japan's greatest peril will arrive when the schools which the common people now attend render them intelligent, or rather make them think they are the intelligence of the country. Unless the nobility are sufficiently wise to merge gradually with the common people a day of bitter struggle and of deliverance will one day arrive.

Sociology. To carry this latter point a little farther, it should be understood that the present industrial condition of Japan is oppressive. The Japanese call their country "The Land of the Rising Sun," as, indeed, it is the first Asiatic country to greet the sun as it rises above the Pacific. The astonishing advance made by the country during the last thirty years, the leadership assumed over the people of China and Korea, and the tremendous defeat administered to Russia in the War of 1904-05, have made Japan the leading native power of Asia; but the problem of Japan has not been worked out yet. To begin with, the people are crowded. Mr. Frederick J. Haskin states that, if the entire population of North America were crowded into Kansas, the agricultural situation would not be more serious. The Japanese farmer on his two-acre plot gives the general government twenty-seven per cent of his produce and pays in addition from two to eight per cent into the local treasury. To do this he sells his rice and lives largely on boiled millet seed and fish. One million, four hundred thousand people are employed. in factories. Men earn fifteen cents, women ten cents a day. Thirty-four thousand children under fourteen years of age receive less. Factory hours are long. Operatives labor from twelve to fourteen, and, in some cases, sixteen and seventeen hours a day.

Taxation. Japanese art has given Western nations the notion that Japan is rather a light-hearted country—a land of butterflies, apple-blossoms, gay color, and lacquer work. Travelers who investigate

the condition of the common people draw a somber picture. The government was paying interest on a huge war debt, is building *Dreadnoughts* that cost millions, is subsidizing merchant vessels, and is spending money in Korea and Manchuria. The wealthy are paying an income tax as high as sixty-eight per cent. The people are working to the verge of endurance. A world disarmament, an escape from the financial burden of an army and navy, would be a godsend to Japan; but in 1914 Japan joined England and the other allies in the great war against Germany. The center of Japan's operations was against the German holdings at Kiauchau on the Shantung Peninsula which was captured October 7. See RECENT HISTORY below.

EMIGRATION. Japan is one of the most densely populated countries in the world, having an average of 350 inhabitants to the square mile. Since she is an island empire it is difficult for the people to establish homes in contiguous territory. Since the United States, Canada, the countries of South America and Australia have large areas that are sparsely populated, Japan naturally regards these regions as desirable for Japanese emigrants, and her attempt to gain a foothold in these countries has led to more or less diplomatic controversy.

RECENT HISTORY. Although Japan's part in the World War was small compared with the accomplishments of other powers, she was successful in removing the German menace to herself and others in the Far East. Japanese troops took the fortress of Tsingtao in the territory of Kaiochow, which Germany had leased from China and the Japanese navy was instrumental in ridding the Pacific of German raiders.

After the Russian Revolution, 1917, the allies requested that Japan send troops to Siberia to aid the Czechoslovakian forces that were attempting to get through Siberia to the aid of the French on the western front. The phenomenal success of the Red Army, however, later brought the Japanese and the Bolsheviki into direct contact, and much bloodshed followed. The Japanese held, and may continue to hold, parts of Siberia for some years.

At the Peace Conference it was decided that Japan, for her services, was to have the mandatories over the German islands in the Pacific. Though China demanded direct restoration of Shantung, Japan protested that it should be returned to China by Japan, as a token of good will. Accordingly, Japan was given control of Shantung, but at once attempted to open negotiations with China for the peninsula's return to the latter country. China, however, refused Japan's offer; but the transfer was accomplished at the Conference on Limitation of Armaments (which see).

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Area, square miles	260,738
Forest area, acres	38,000,000
Population (1920)	77,005,510
Chief Cities:	
Tokyo	2,173,162
Osaka	1,252,972
Kobe	608,628
Kyoto	591,305
Nagoya	429,990
Yokohama	422,942
Nagasaki	176,554
Hiroshima	162,391
Number of prefectures	47
Members of House of Peers	373
Members of House of Representatives	463
National revenue	$451,000,000
Bonded indebtedness	$1,550,000,000
Farm lands, acres	94,495,000
Cultivated area, acres	17,639,000
Wheat, bushels	27,874,000
Rice, pounds	19,106,364,000
Barley, bushels	89,898,000
Rye, bushels	37,290,000
Tobacco, pounds	113,360,000
Tea, pounds	83,211,540
Raw silk, pounds	24,300,000
Domestic Animals:	
Horses	1,479,682
Cattle	1,344,865
Sheep	5,098
Goats	125,089
Swine	470,082
Manufacturing establishments	22,391
Operatives	1,409,196
Gold, pounds	16,155
Silver, pounds	356,851
Copper, tons	807,000
Coal, tons	34,300,000
Steel, tons	314,844
Pig iron, tons	223,312
Sulphur (refined), tons	55,000
Sulphur (ore), tons	18,300

Petroleum, barrels (42 gals.)....	180,000
Raw silk, value.....	$185,168,000
Cotton yarn, value.....	$79,259,000
Silk manufactures, value	$35,089,000
Imports $1,118,087,350	
Exports	$979,194,730
Matches exported	$13,870,318
Earthenware exported	$9,978,800
Miles of railway.....	6,202
Teachers in elementary schools...	172,979
Pupils enrolled	8,137,347

Japan Current, or Kuro Shio, a warm current of the Pacific Ocean, which flows along the southeast shores of Asia. Its source is in the north equatorial current, and its rate of flow varies with the seasons. It is easily discernible by those who sail the seas by the deep blue of its waters. It passes the east coast of Formosa, is deflected to the northeast, and then flows towards the southwestern part of Japan. A branch of its passes into the Yellow Sea and another branch into the Japan Sea; but it does not, as formerly was supposed, flow through Behring Sea.

Japanese Literature. See LITERATURE.

Jarley, Mrs., in *Old Curiosity Shop* by Charles Dickens, the owner and exhibitor of "Jarley's Wax Works." She was "a Christian lady, stout and comfortable to look upon, who wore a large bonnet trembling with bows." She traveled through the country in a tidy little caravan displaying her wax works—"the tall man, the short man, the old lady who died of dancing at a hundred and thirty-two, the wild boy of the woods, the woman who poisoned fourteen families with pickled walnuts, and other historical characters and interesting but misguided individuals."

Jasmine, a woody climber, native to the South. The Carolina jasmine grows in rich woods from Virginia to Texas. It has shining evergreen leaves, and a wealth of bright yellow, exquisitely fragrant, handsome flowers, opening in March and April while the north is yet frost bound. The blossoms are deeply funnel shaped, with wide lobed borders. A cottage with jasmine over the door is certainly a poetical conception. Like our American "robin" and many other names of plants and animals, jasmine is not strictly speaking a jasmine at all. A tincture of the root is used as a remedy for nervousness and spasms. An overdose produces paralysis.

Jason, in Grecian legend the leader of the Argonautic expedition. Jason was the son of Aeson, a king of Thessaly. Aeson became tired of his responsibilities and gave up the kingdom to his brother, Pelias, on condition that he would yield it to Jason when he became old enough to reign. When Jason was grown, he demanded his rights. Pelias was unwilling to yield the crown, but he was a wily individual and laid plans for getting rid of Jason. He told the young man that he was ready to give up the kingdom, but that it would be much wiser if he, Jason, should perform some deed of valor by which he could win wealth and fame before he settled down to the duties of ruling. Pelias suggested an expedition in search of the golden fleece, which he said was in Colchis on the eastern shore of the Black Sea. Jason thought well of his master's plan and fitted out an expedition. He built himself a ship that would hold fifty men, which is described in the article on ARGONAUTS. Jason won both the golden fleece and a wife, Medea, but he was not very happy with her. She restored his father to youth by her enchantments, but she slew his uncle. Jason finally deserted her for another. Medea, in rage at his unfaithfulness, killed her children, set fire to the palace, and departed never to return. Jason, according to some accounts, killed himself soon after. Another version of the story is that he lost his life accidentally. See CADMUS.

Jasper, a stone used for decorative purposes. Different varieties differ in color; it is found in dark green, grayish blue, brownish black, and reddish brown. Like jade it can be beautifully polished, and is used for vases, small boxes, belt pins, and like articles. It is also in demand for pillars, table tops and interior finishings. Owing to its strength, jasper is frequently used for the walls of buildings. Agate jasper is jasper in layers with chalcedony; this variety is also known as ribbon jasper; the yellow and brown varieties are known as Egyptian jasper.

Jasper is found in many parts of the United States, the most generally known

quarries being at Pipestone, Minnesota, Sioux Falls, South Dakota, and several places in Colorado.

Jastrow, Joseph (1863-), an American psychologist, one of the sons of Marcus Jastrow, was born in Poland, and went with his parents to Philadelphia in 1866. He graduated at the University of Pennsylvania in 1882, and later was fellow in psychology at Johns Hopkins University. From 1888 to 1903 he was professor of experimental and comparative psychology at the University of Wisconsin. Professor Jastrow was head of the psychological section of the World's Columbian Exposition, and in 1900 became president of the American Psychological Association. He has made constant contributions to publications devoted to psychology, and is the author of the following works: *Time Relations of Mental Phenomena, Epitomes of Three Sciences, Fact and Fable in Psychology, The Subconscious, The Qualities of Men, Character and Temperament.*

Jastrow, Morris (1861-1921), an American orientalist, was born in Warsaw, Poland, emigrating to the United States when five years old. He was educated in the schools of Philadelphia, and later studied at the University of Pennsylvania, and at the universities of Leipsic, Breslau, Paris and Strassburg. In 1885 he became professor of Semitic languages and librarian at the University of Philadelphia. He was president of the American Oriental Society from 1904 to 1905 and president of the Society of Biblical Literature in 1916. He was the author of many works on the religions and civilization of Babylonia and Assyria, *The War and the Baghdad Rail-Way, The War and the Coming Peace, A Gentle Cynic* and *Zionism and the Future of Palestine.*

Jaundice, jän'dĭs, a yellow color of the skin and eye. It arises from coloring matter in the skin which the liver, whose province it is, has failed to remove. As one whose liver is out of order is not likely to look on the world with a pleased eye, the term "jaundiced" has been applied proverbially to one who is out of sorts.

> All seems infected that th' infected spy,
> As all looks yellow to the jaundic'd eye.
> —Pope, *Essay on Criticism.*

Jaunting Car, a light two-wheeled vehicle peculiar to Ireland. The driver has a perch in front; the seats run lengthwise back to back, but usually with a space between them for baggage. Tourists landing at any of the frequented points in Ireland are besought by the Irish Jehu to take a ride on his jaunting car. The car has, at best a jiggling chaise motion, but it affords a novel ride.

Java, jä'va, the most important island of the Dutch East Indies. It is the most fertile, the most highly cultivated, and the most densely inhabited island in the archipelago. It is about 660 miles in length from east to west. The area is 50,554 square miles, a little less than that of Alabama. The island is mountainous. The highest summit reaches an elevation of 12,000 feet. No equal area contains so many volcanoes. The soil is rich. It consists of mud—sea bottom, not lava—poured forth from the craters which forms plantations of unsurpassed fertility.

Java is covered with dense tropical vegetation and has long been termed a botanist's paradise. It is classic ground for collectors of ferns. The jungles are so matted with parasitic creepers that it is difficult to distinguish one plant from another. There are many birds of bright plumage, including the peafowl. Over 200 species have been listed. Apes, tigers, leopards, rhinoceroses, and wild cattle are still found. Remains of an extinct animal more like man than ape have been found.

The island is peopled by various tribes of the Malay race with a Hindu admixture. They are nominally Mohammedan. Several thousand make the pilgrimage to Mecca each year. The population is over 35,000,000. Of these less than 1,000,000 are European and Chinese. In parts there are over 900 inhabitants to the square mile. The island has twenty-three residences, controlled by a governor general and a council of five as a legislative or advisory body.

The Dutch capital is Batavia. It is a well built city with canals and shade trees. The governor general of the Dutch possessions in this part of the globe lives here. Dutch occupancy dates from the decade of activity in which Jamestown, Virginia, was founded. During the earlier years the mild

mannered natives were required to work. The government allowed them food and clothing. All surplus was sent home to Holland. This form of slavery was abolished by degrees. The government now collects a poll tax of forty cents a year instead. Ownership of the soil is retained to a large extent by the government. Fields are let to tenants on long leases. Rice, sugar-cane, maize, cotton, tapioca, vanilla, tobacco, indigo, coffee, and tea are the chief field crops. The famous "Java" coffee for which the island is noted has fallen a prey to insect pests, and the planters have been forced to rely on a hardier variety. The forests yield rattan, pepper, cinnamon, quinine, copra, cocoa, teak, and cubebs. The principal mineral productions are tin, coal, and petroleum. Cloth, tools, and machinery are the chief imports. Trade is open to the world, but is carried on chiefly with the Netherlands. In the more prosperous districts schools are maintained for the natives. Possibly 100,000 children are in attendance.

Owing to the intense heat of the coast the governor general resides inland about forty miles from Batavia, where a city has been built on a mountain slope at an altitude of 700 feet above the sea. This mountain village is the real seat of government. It is noted for one of the finest botanical gardens in the tropical world. There are roadways lined with gigantic trees, draped with climbing vines. The gardens are rich in rattans, orchids, pitcher plants, palm trees, and bamboos. There are lakes and pools in which the lotus, blue water lilies, the papyrus of ancient Egypt, and many other interesting aquatic plants grow. Java has been termed the "Garden of the East," "the most beautiful and fascinating of all islands."

Javelin, jăv'lĭn, a short, light spear thrown from the hand. It consisted of a metal point fixed at the end of a wooden shaft or handle. A strap was sometimes attached to aid in flinging the weapon with force and accuracy. It is an ancient weapon. Saul, it will be remembered, strove to smite David to the wall with a javelin. The pilum which was thrown by Caesar's soldiers, and which caused the attacking Gauls so much inconvenience by pinning their overlapping shields together, was a weapon of this sort. The javelin was a favorite weapon of the Persian horseman and may well be regarded as the forerunner of the knight's lance. In the Middle Ages the javelin or boar spear was the trusty weapon of the hunt.

To be advised, thou know'st not what it is
With javelin's point a churlish swine to gore.
—Shakespeare, *Venus and Adonis.*

Jay, a genus of birds belonging to the crow family. The common jay of England is an ashen gray bird tinged with red or purple and marked with black. Only its wing covers are blue. The Florida jay is a gray-blue bird of the Florida coast. A small bluejay is also local in the Gulf States. The Canada jay, whiskey jack, moose bird, or lumber jack, as it is variously called, is a grayish bird with a white forehead and a dirty white neck "like a magnified chickadee clad in singularly fur-like, thick, puffy gray feathers." It is a familiar adjunct of northern lumber camps. It establishes intimate relations with one who rests to eat a lunch, and will fly down almost within a hand's reach for crumbs or bacon rinds thrown from the camper's tin plate. It nests in March before snow goes off, and manages in some way, like an owl, to keep its eggs from freezing.

The common bluejay, well named from voice and color, is an intelligent bird of striking habits and plumage, too well known to require description. "The bluejay, that noisy coxcomb, in his gay light-blue coat and white under-clothes; screaming and chattering, nodding and bobbing and bowing, and pretending to be on good terms with every songster of the grove," says Washington Irving. None overlook the large crest on its head and the deep blue wings and tail; but few boys, perhaps, have noted that the white tip of its blue tail does not cross the middle pair of tail feathers, that the wings are barred with black, and that a black stripe runs from the back of the head down the sides of the neck and across the breast. In addition to his excellent quality of staying with us all the year around, the bluejay is really an efficient provider. All through the autumn this blue worker is busy hammering nuts, acorns, seeds, and grains of corn into the forks and

split branches of trees. It is credited with considerable ability in mimicking the call of other birds and is something of a ventriloquist. Justice requires the admission that the jay is addicted to harrying the nests of small birds and to devouring both eggs and nestlings. On this account a shotgun is not infrequently brought into requisition, when otherwise this shrill aristocrat would be welcome to consider the dooryard his particular province. Ordinarily the blue-jay nests in the crotch of a scrub oak about fifteen feet from the ground. From four to six olive green eggs are marked usually with faint cinnamon brown spots.

See CROW.

Jay, John (1745-1829), the first chief justice of the United States supreme court. He was a native of New York City. His father was a merchant of Huguenot descent, his mother belonged to an old Dutch family. He was educated at King's College, now Columbia. His graduation oration lauded the blessings of peace. At the outbreak of the Revolutionary War his voice was for smoothing over the difficulties with the mother country; but when he became convinced that "there is no peace," he joined the patriot cause. He sat in the Continental Congress and drafted an address to the people of Canada, asking them to throw in their lot with ours. By right his signature should have appeared on the Declaration of Independence, but, when it was signed, he was unfortunately detained at home to prepare a constitution for his native state. Later he was a minister to Spain. At the close of the war he joined Franklin in Paris, and took an important part in the negotiations for peace. He and Franklin were not quite in accord. Jay and Adams were undoubtedly right in suspecting our ally, France, of a design to limit our territory to the Appalachian tract. Their insistence finally persuaded Franklin to act with them, and the marvelously favorable treaty was secured. During the debates on the adoption of the constitution Jay wrote many able papers, since included in *The Federalist,* in its favor. Upon the organization of the general government Washington appointed Jay chief justice, an honor which he later resigned to be minister to England. In this capacity he negotiated the Jay treaty which made him exceedingly unpopular. Though offered the chief-justiceship again he declined and retired to an estate of 800 acres at Bedford, about forty-four miles from New York City. The old Jay house, built in colonial style, still stands at the end of an avenue of fine old elms. His table and chair and a pair of Spanish pistols are there. Here he was fond of a long clay pipe after dinner, and spent a large part of his time in reading and writing. He led a regular, simple life, preaching economy and thrift. At his death he left directions that his funeral be simple, and that $200, which might otherwise have been spent, be sent to a poor, worthy widow of the neighborhood. It is pleasant to record that his children carried out his last wish.

Jean Paul. See RICHTER, JEAN PAUL.

Jefferies, jĕf′rĭz, **Richard** (1848-1887), an English essayist. He was a native of Wiltshire. He wrote several volumes of outdoor essays in which the reader may trace the delightful influence of Isaak Walton. He is to the British reader what John Burroughs is to the American. His writings are full of the keenest observations and make the reader feel as though he wanted to get away from town into unfrequented byways, field, and forest. The nature of his writing is indicated by the titles he chose: *The Gamekeeper at Home, Wild Life in a Southern Country, Round About a Great Estate, The Life of the Fields, The Open Air, The Amateur Poacher, Wood Magic, Red Deer, Field and Hedgerow,* and his remarkable autobiography, *The Story of My Heart.*

Jefferson, Joseph (1829-1905), a noted American actor. He was born in Philadelphia, February 20, 1829, and died at Palm Beach, Florida, April 24, 1905. On his father's side he came of an old and honorable theatrical family. His great grandfather was a well known London actor in the time of the noted Garrick.

"Joe" Jefferson's association with the stage began in early childhood. In an autobiography published in 1890 he says of himself, "I may almost say I was born in the theater." As a child he appeared first in the character of Jim Crow, a negro minstrel. He traveled in the West with his

father. Lincoln, then a struggling young lawyer, did them a good turn once by securing the repeal of a prohibitive license imposed by the authorities of Springfield.

Jefferson's first great success was in the role of Irving's *Rip Van Winkle.* He was a capital Caleb Plummer in Dickens' *Cricket on the Hearth.* He personated other characters well, but the public never wearied of hearing Rip. So Rip he represented season after season for forty years. In all these long years of public life Jefferson was regarded not only as an actor but as a gentleman. No American actor has been more popular. None has exerted a greater influence for good. He inherited a genial, happy manner and natural ability. Industry and economy brought him wealth. Correct habits and good health brought him on to a ripe old age in which he continued to bear an untarnished reputation. He was dubbed affectionately "the dean of the American stage." He died at his winter home in Florida asking that his head be raised that he might look out on the unresting sea.

Jefferson, Thomas (1743-1826), the third president of the United States. His father, Peter Jefferson, was an uneducated man, possessed of sound common sense. He was an Indian fighter, a surveyor, and a frontiersman. He made his home in one of the western counties of Virginia at the foot of the Blue Ridge. Here Thomas Jefferson was born. He inherited his father's sterling qualities. Both as a boy and as a man he was sturdy, independent, and a friend of the common people. His mother was a Randolph. She belonged to one of the most aristocratic families of the Old Dominion, a family of noted clergymen, lawyers, physicians, and statesmen. From her he inherited refinement of manner and an intense love of study. She saw to it that he was educated at William and Mary College, and that he associated with the most refined society of the day.

Though democratic in his manners and dress, Jefferson was universally conceded to be in all respects a gentleman. Few men have shown greater versatility in public life. At the age of twenty-six he was a member of the Virginia Assembly. He sat in the First Continental Congress and was governor of Virginia in 1779-1781. He was ambassador to France for five years and was secretary of state during a part of Washington's administration. He was a member of the committee instructed to draft the Declaration of Independence. He is credited with having produced that document almost unaided. During the early years of the republic Jefferson was one of the foremost advocates of the doctrine that the government should be given as little power as possible, and that the less it did the better. He retired from Washington's cabinet because he was dissatisfied. He opposed Adams' election to the presidency. In 1801 he was himself a candidate on a people's platform. There were four candidates. The vote for Jefferson and Aaron Burr was a tie. The election was carried into the House of Representatives. On the thirty-sixth ballot Jefferson was chosen by a majority of six votes over Burr, to whom the vice presidency fell.

Jefferson's first term was a brilliant success. His inaugural address calmed the Federalists who feared leveling tendencies. He introduced simple manners into the White House, dropped all formality of intercourse between himself and members of the cabinet as well as in his communications to Congress. Under his management and that of his secretary of the treasury, Albert Gallatin, revenues increased, expenses and debt decreased. The pirates of Barbary, to whom tribute had been paid for some years, were handsomely punished and brought to terms. Louisiana was purchased for $15,000,000, and the Pacific frontage in Oregon was explored. He prevented his friends from sweeping the Federalists entirely out of office, and crushed his most persistent and able enemy, Aaron Burr.

His second term was less successful. England and France were at war; even Jefferson's utmost efforts could not prevent the infant navy and the merchant ships of the United States from suffering many indignities. The capture of the Chesapeake and other humiliations belong to this period. It was during this term that the clumsy Claremont steamed up the Hudson against wind and tide to Albany. Jefferson was urged by his friends and petitioned by the legislatures of nearly all the states

to accept a third term of office, but he declared that a third term would be a bad precedent. He retired to his home at Monticello, near Charlottesville, Virginia, where he died July 4, 1826, just fifty years after the signing of the Declaration of Independence.

Aside from the fact that he was a poor financier, at least an inefficient administrator of his own affairs, Jefferson was a great man from whatever point of view his actions be regarded. He was not only a musician and mathematician, but he had a magnificent command of the English language. He foresaw, as few have seen, the present conflict between capital and labor. He foresaw the development of the United States and the immense advantage of possessing the western half of the Mississippi Valley. His public views were far larger than those of Webster, Calhoun, or Clay. No public measure was seemingly too great to be grasped; nor was any measure likely to benefit the public too trifling to interest him. When minister at Paris, he filled his leisure moments, like Franklin, in sending home accounts of useful inventions. He was the first to send home a package of rice, with the suggestion that experimental plantings be made. His library was his chief companion. He favored absolute political equality, the emancipation of slaves, the establishment of public schools, and religious equality. He feared wealth and official power. He trusted the people. Whether regarded as a patriot, a statesman, or a scholar, he deserves to rank among the greatest men this country has ever produced. Many assert that Franklin, Washington, Jefferson, and Lincoln are our four great men.

Jefferson was buried at Monticello. The epitaph he himself chose for his tombstone: "Here lies buried Thomas Jefferson, Author of the Declaration of Independence, of the Statute of Virginia for Religious Freedom, and Father of the University of Virginia."

A great deal is said of Jefferson, but his own words are not quoted as often as they should be for so clear a thinker. Jeffersonian principles are referred to frequently by the press and by campaign orators. Here are some of them taken from his first inaugural, spoken at the supreme moment of his life:

About to enter, fellow citizens, on the exercise of duties which comprehend everything dear and valuable to you, it is proper that you should understand what I deem the essential principles of our government, and consequently those which ought to shape its administration. I will compress them within the narrowest compass they will bear, stating the general principle, but not all its limitations.

Equal and exact justice to all men of whatever state or persuasion, religious or political.

Peace, commerce, and honest friendship with all nations, entangling alliances with none.

The support of the state governments in all their rights, as the most competent administrations for our domestic concerns and the surest bulwarks against anti-republican tendencies.

The preservation of the general government in its whole constitutional vigor, as the sheet anchor of our peace at home and safety abroad.

A jealous care of the rights of election by the people—a mild and safe corrective of abuses which are lopped by the sword of revolution where peaceable remedies are unprovided.

Absolute acquiescence in the decision of the majority—the vital principle of republics from which there is no appeal but to force the vital principle and immediate parent of despotism.

A well-disciplined militia, our best reliance in peace, and for the first moments of war, till the regulars may relieve them.

The supremacy of the civil over the military authority.

Economy in the public expense, that labor may be lightly burdened.

The honest payment of our debts and sacred preservation of the public faith.

Encouragement of agriculture and commerce as its handmaid.

The diffusion of information and the arraignment of all abuses at the bar of public reason.

Freedom of religion; freedom of the press; freedom of the person under the protection of habeas corpus; and trials by juries impartially selected.

These principles form the bright constellation which has gone before us, and guided our steps through an age of revolution and reformation. The wisdom of our sages and the blood of our heroes have been devoted to the attainment. They should be the creed of our political faith—the text of civil instruction—the touchstone by which to try the services of those we trust; and should we wander from them in moments of error or alarm, let us hasten to retrace our steps and regain the road which leads alone to peace, liberty, and safety.

Let us then, with a courage and confidence, pursue our own federal and republican principles, our attachment to our Union and representative government. Kindly separated by nature and a wide ocean from the exterminating havoc of one quarter of the globe; too high minded to endure the degradations of the others; possessing a chosen country, with room enough for our descendants to

the hundredth and thousandth generation; entertaining a due sense of our equal right to the use of our own faculties to the acquisitions of our industry; to honor and confidence from our fellow-citizens, resulting not from birth but from our actions, and their sense of them; enlightened by a benign religion, professed, indeed, and practiced in various forms, yet all of them inculcating honesty, truth, temperance, gratitude, and the love of man; acknowledging and adoring an overruling Providence, which, by all its dispensations, proves that it delights in the happiness of man here, and his greater happiness hereafter; with all these blessings what more is necessary to make us a happy and prosperous people? Still, one thing more, fellow-citizens—a wise and frugal government, which shall restrain men from injuring one another, which shall leave them otherwise free to regulate their own pursuits of industry and improvement, and shall not take from the mouth of labor the bread it has earned. This is the sum of good government, and this is necessary to close the circle of our felicities.

See LOUISIANA PURCHASE; LEWIS AND CLARK; BURR; DECLARATION OF INDEPENDENCE.

Jefferson City, the capital of Missouri. It is situated on the Missouri River, about one hundred twenty-five miles west of St. Louis, and near the center of the state. The surrounding country is rich in farm products, timber, coal, iron, building stone, and other minerals; hence, Jefferson City has a thriving commerce. Among the manufactures are flour, wagons and carriages, farm implements, foundry products, shoes, beer, brooms, and bricks. Jefferson City has one of the largest saddle-tree manufactories in the world. This industry together with that of the manufacture of binding twine, shoes, and overalls is carried on in the State Penitentiary which is located here.

Numerous handsome state and county buildings are located here besides Lincoln Institute, for colored pupils, and a Carnegie public library. The population in 1920 was 14,067.

Jeffrey, jĕf′rĭ, **Francis** (1773-1850), a Scottish lawyer and man of letters. He was well educated at the high school and University of Glasgow. He attended Oxford also. He studied law at Edinburgh and was admitted to the bar. He had little practice as a lawyer. With Sydney Smith he entered into a project to establish a political magazine. October 10, 1802, the first number of the *Edinburgh Review* appeared. The editorial management belonged to no one in particular at first, but later it devolved on Jeffrey. Constable was the publisher. Jeffrey was a writer of ability. His own contributions to the *Review* exceed 200. He had a faculty of discovering young writers and of giving talent free scope. Sir Walter Scott, Carlyle, and Macaulay were among his contributors. His judgment was not always correct. He attacked Byron bitterly, and failed to recognize the merits of Coleridge, Southey, and Wordsworth. Despite his faults and his bitter partisanship as a Whig, Jeffrey will rank always as one of the greatest review editors the world has known. His editorial work came to a close in 1829. He represented Edinburgh in Parliament for several years, and sat on the supreme bench of Scotland for sixteen years, leaving a reputation as a popular, upright judge. See MACAULAY.

Jeffreys, George (1648-1689), lord chancellor of England. He appears to have been born of respectable parents who made a great effort out of their small means to enable him to accomplish his desire of becoming a lawyer. He chose criminal law for his specialty, and became noted in the defense or prosecution, as the case might be, of the low characters whose trials were held before the court known as the "Old Bailey." He was talkative and insufferably overbearing toward his inferiors, but an adept at flattering those from whom he had something to gain. According to all accounts he was a most disagreeable, venal character. He rose steadily, however, to various positions of trust in the city of London. When it became worth his while to do so, he deserted the popular party for the service of the Stuarts. Charles II made him a baronet and a chief justice, but, for all that, declared that he was "a wretch with no learning, no sense, no manners, and more impudence than ten carted street walkers."

During the reign of Charles' brother, James II, Jeffreys conducted the Bloody Assizes, following the inglorious suppression of Monmouth's Rebellion. The post of lord chancellor was vacant. He coveted the prize. He set himself at work to butcher the prisoners who had been taken. It

is said that his ferocity on the bench at this period was little short of savagery, or else insanity. The official report shows that 320 prisoners were ordered to execution. Historians say that double that number were actually executed; 800 were sold to labor in the West Indies. Others who had the means purchased their pardon. As a reward James gave him the lord chancellorship.

When the English revolution broke out Jeffreys realized that he was unlikely to receive mercy. He shaved off his shaggy eyebrows, disguised himself as a common sailor, and attempted an escape to Hamburg in a small vessel; but, while drinking at a low public house, he was recognized by a clerk who had seen him on the bench. He escaped being torn to pieces by a mob only by the timely arrival of a guard, who conducted him to the Tower of London. Here he lay for some months in daily fear of his life. A drunken death put an end to his miseries. His character appears to be without redeeming qualities.

Jejeebhoy, Sir Jamesetjee (1783-1859), a Bombay merchant, who, beginning as a poor boy, by his thrift and energy accumulated a fortune. He is remembered for his charities and his public works, among which are a large hospital presented the city of Bombay and a causeway that connected the island on which the city is situated with the main land. He was knighted by Queen Victoria and a statue to his honor was erected in the town hall at Bombay.

Jellicoe, jel′ i ko, **Sir John Bushworth,** (1859——), a British admiral who was in command of the Grand Fleet of Great Britain from 1914 to 1916. He entered the navy at the age of thirteen. He served in Egypt in 1882, where he won a medal. Soon after this he was raised to the rank of lieutenant and won a prize at the Royal Naval Academy. He served in China from 1898 to 1901, where he was chief of staff to Vice-Admiral Seymour, during the Boxer Rebellion. In 1907 Jellicoe was made rear-admiral and in 1914 he was given command of the Grand Fleet. He commanded the fleet in the Battle of Jutland in 1916. Later in the year he was succeeded by Sir David Beatty (which see) and became First Lord of the Admiralty. He was made admiral in 1917, and the same year he relinquished his position.

Jelly. See PRESERVES.

Jelly-Fish, the common name of a sea animal which, when cast up on the sand of the beach, seems only a mass of jelly. The commonest variety, that found on the New England coast, consists of a circular disk of jelly, called the umbrella, often fringed with long tentacles and from the center of which hang the feeding organs. By alternately contracting and expanding this disc the jelly-fish moves freely about in the water. From the time it is hatched from the egg the jelly-fish requires two years to mature, going through several interesting stages of development. Some forms of jelly-fish are of almost unbelievable beauty.

Jellyby, jĕl′i-bi, **Mrs.,** in Dickens' *Bleak House,* a woman so absorbed in charitable work and in foreign missions as to neglect her own household. She spends her time in planning and arranging for emigration to Borrioboola-gha while her own children are neglected and unhappy.

Jena, yā′nä, a university town of Germany. It is pleasantly situated twelve miles east of Weimar, on the Saale. Interest centers in the university which was founded in 1558, and reached its period of greatest prosperity toward the close of the eighteenth and during the early part of the ninteenth centuries. Its reputation is connected with the names of Schiller, Humboldt, Schelling, and Goethe. Many American students who have since become eminent in the world of thought, studied here. There are collections of coins and other antiquities, a library of 180,000 volumes, a bontanical garden, an observatory, and other educational facilities. The battle of Jena that put Prussia at the mercy of Napoleon, was fought a little to the north of the town in 1806. The cliffs of the Saale are of unusual interest to geologists. The population of the town is about 48,500.

Jenghis Khan. See GENGHIS KHAN.

Jenkins, John Edward (1838-1910), an English author, who was born at Bangalore, India. He received his education at McGill University, Canada, and at the University of Pennsylvania. He is a liberal

and has written books and pamphlets on political subjects. His works include *Lord Bantam, Little Hodge, A Paladin of Fortune, Jobson's Enemies,* and the one which made him famous, *Ginx's Baby, His Birth and Misfortunes.* It is a satire on the management of pauperism in England, including the national poor laws and also the administration of sectarian charitable institutions. It was published in 1871 and exerted a marked influence upon social reforms.

Jenner, Edward (1749-1823), an English physician of Gloucestershire. Young Jenner went up to London and studied medicine with the celebrated anatomist, John Hunter, in whose family he lived for two years. On returning to his native Berkeley he gave his attention to the plague of smallpox permanently prevalent in all parts of the country. Starting with the hint given by the dairymen that those who had taken cowpox by milking cows were not subject to smallpox. Dr. Jenner investigated the matter and formulated a regular plan of giving vaccinia or cowpox as a preventive of the more dangerous pox. He had the courage even to vaccinate his own child. In 1798 he published his method of vaccination. His method was adopted for the British Army, and grants of $150,000 were made him by Parliament. See VACCINATION; SMALLPOX.

Jerboa, a long-tailed jumping mouse of the Old World. The jerboa of Africa lives in large colonies in extensive underground galleries. It has short front legs and very long hind ones which, with its extended tail, enable it to jump prodigious distances. The body of the jerboa is about eight inches in length. See MOUSE.

Jeremiah, one of the greater prophets of the Old Testament. He was of priestly descent, his father being Hilkiah, and he lived in Anathoth, about 3 miles from Jerusalem. He became a prophet about 629 B. C., and he continued to prophesy for 41 years, during which period Judah suffered heavy disasters, and Jerusalem was made a heap of ruins by the invasions of the Babylonians. He wrote the book of *Jeremiah,* one of the canonical books of the Old Testament, and the *Lamentations.* Tradition says that the aged prophet was put to death in Egypt for preaching against idolatry.

Jericho. See PALESTINE.

Jerome, Jerome Klapka (1859-), an English author and editor, who has also been a clerk, a schoolmaster, and an actor. He was born at Walsall, Staffordshire. In 1885, Mr. Jerome published *On the Stage —and Off,* a work dealing with his experiences in the theatre. This was followed by *Idle Thoughts of an Idle Fellow,* and *Three Men in a Boat.* The delicious humor of these works won for Mr. Jerome a wide reputation. From 1892 to 1897, he edited *The Idler,* and during 1893-97, *Today.* For the stage, Mr. Jerome wrote *Sunset, Wood Barrow Farm,* and *The Mac Haggis.* Among his other publications is *The Passing of the Third Floor Back.*

Jerome, Saint (346-420), a father of the Latin church. He was born at Stridon, a frontier between Styria and Hungary. He went to Rome while quite a young man and there studied Greek and Roman classics. There, too, he was baptized into the Christian faith. He traveled in the East, pursuing his studies until a dream led him to renounce classical learning and devote himself to the Bible. For four years he lived a hermit, enforcing upon himself the most rigid discipline and the most laborious studies. At this time he learned Hebrew that he might translate the Bible. He was ordained as a presbyter at Antioch and later began to expound the Scriptures at Rome at the same time beginning to revise the Latin New Testament. Finding his work resented by the clergy he went to Palestine and there at Bethlehem founded a monastery in which he spent the remainder of his life. He translated the whole Bible into Latin. *Jerome's Vulgate,* as his version is called, is regarded as the foundation of ecclesiastical Latin. Jerome is considered the greatest scholar of the Western church.

Jerrold, Douglas (1803-1857), an English wit. He was born near London. When a lad he went to sea as a midshipman. On leaving the service he was bound as an apprentice to a London printer. He had a natural taste for learning and improved his spare time in studying Latin

and modern languages. He had a decided bent for dramatic writing. *Blackeyed Susan,* written before he was twenty years old, was represented for 300 successive nights at the Surrey Theater in 1829. Other plays, popular at the time, but now forgotten, are *Rent Day, Nell Gwynne, The Housekeeper, Time Works Wonders,* etc. He embarked in publishing, founding the *Illuminated Magazine* and *Douglas Jerrold's Shilling Magazine.*

He was for years a leading member of the staff of the London *Punch,* to which he contributed *Mrs. Caudle's Curtain Lectures, Punch's Letters to his Son, The Story of a Feather,* and other humorous sketches. His reputation is that of a kindly man who sought to improve the world less by stinging than by turning the laugh against vice and foible. See CAUDLE'S CURTAIN LECTURES.

QUOTATIONS.

He is one of those wise philanthropists who, in a time of famine, would vote for nothing but a supply of toothpicks.

The surest way to hit a woman's heart is to take aim kneeling.

The best thing I know between France and England is the sea.

Earth is here so kind that, just tickle her with a hoe, and she laughs with a harvest.

The ugliest of trades have their moments of pleasure. Now, if I were a grave-digger, there are some people I could work for with a great deal of enjoyment.

A blessed companion is a book,—a book that fitly chosen is a lifelong friend.

Jersey. See CHANNEL ISLANDS.

Jersey, in England, a term long used to designate the finest and longest wool in a fleece, so called from the island of Jersey in the English channel noted for its fine-wooled sheep. The name came gradually to be applied to fine worsted yarn. Still later it was given to a close fitting knitted upper garment which has been popular in America and England in various styles and shapes for nearly a century. Jersey cloth is a name given to wool stockinet. See STOCKINET.

Jersey City, the second city of New Jersey. It has five miles of Hudson River frontage immediately opposite New York City. Four Hudson River tunnels, completed in 1909, connect it with the New York side. By means of these, three of the principal railroads which formerly had their terminals at Jersey City now enter the Hudson terminal station at Cortland and Church streets, New York City. The system of immense steam ferries carrying passengers and freight is still continued, subways and ferries combining to give excellent communication between the cities. Numerous transatlantic lines of steamers, especially freight steamers, connect with the railways at the Jersey City wharves. There are immense grain elevators, coal docks, and storage depots for freight. In addition to shipping and transfer facilities there are large manufacturing interests. Slaughtering and meat packing are carried on on an enormous scale. There are manufactures of tobacco, implements, locomotives, boilers, furnaces, and iron bridges. Cars, carriages, boxes for the shipment of goods, barrels, and casks are made in immense numbers. One of the largest leadpencil factories in the world is located here. There are immense sugar refineries. Many other articles of trade, such as brass and copper goods, scientific apparatus, crucibles, watches, jewelry, organs, pianos, mineral water, patent medicines, perfumes, chemicals, paints, roofing material, paper, rubber goods, silk thread, oakum, fireworks, ink, varnish, and other articles too numerous to mention, are made here. The city has the usual wholesale, retail, and residence districts, and, like other American cities, it is struggling with the various municipal problems of lighting and paving, and of maintaining a system of education. In 1900 the population was reported at 206,433, about one-third being foreign born. The census of 1910 reports a population of 267,779; 1920, 297,864. See NEW JERSEY.

Jerusalem, the capital and chief city of Palestine. Its site is a quadrangular plateau half a mile square, surrounded on three sides by steep valleys, 300 to 400 feet deep—a sort of natural fortress. The ancient site is the same as the modern, save that debris has collected to a depth of from thirty to forty feet. During its eventful history the city has been surrounded by walls again and again. Fourteen centuries

before Christ it is mentioned as a hill fort with a garrison. It was then the capital and citadel of the small kingdom of Jerusalem. At the time of the invasion of Canaan by the children of Israel it was a fortress of minor importance, and was left undisturbed until David captured it from the Jebusites and made it his capital. Even then it was but a small fortress. Solomon made it a city. He built the Temple and extended the walls to embrace more territory. Jerusalem was razed by Nebuchadnezzar in 586 B. C., and its inhabitants were carried away into captivity. The city was rebuilt and destroyed repeatedly during the centuries that followed. Under a native prince the temple was rebuilt, the walls were restored, business revived, trains of camels passed in and out through its gates, and Jerusalem again became the center of the Jewish world. It next passed under the dominion of Rome. The condition of the city in the time of Christ is more or less familiar to the New Testament student. Titus destroyed the city in 70 A. D., after one of the most barbarous and atrocious sieges recorded in history. Later it was held by Persian, Arab, Crusader, and Turk. In December, 1917, the English, under General Allenby, wrested the city from Turkey, and occupied it in behalf of the Allies. The present city is that built by the Saracen known in history as Solyman, the Magnificent. Modern excavations have resulted in identifying the chief features of the successive cities.

Aside from the plan of the Temple, now fairly well made out, the most interesting discoveries are the various aqueducts, tunnels, and rock-cut cisterns on which the city depended for water. It is estimated that the reservoirs were capable of holding 10,000,000 gallons. The aqueduct of Pilate, which conducted water from the pool of Siloam, seven miles distant, was used as a source of supply for Jerusalem during the 400 years of Turkish domination. British engineers, two months after entrance into the city, built a modern water system, thus eliminating necessity for the picturesque but germy water-bag of antiquity. The walls of modern Jerusalem are 25 to 50 feet high, enclose 210 acres, and have 8 gates. Streets, flat-topped stone buildings, synagogues, and mosques occupy the area almost solidly.

The Holy City may be reached by rail from Jaffa, 33 miles distant on the Mediterranean. There is now good railway service between Cairo and Jerusalem. Nevertheless, caravans wend their way to and fro in all directions. The present population is about 80,000, two-thirds Jew. There are about 10,000 Mohammedans and as many Christians of various denominations. The business of the city is quite largely the reception and entertainment of travelers. The site of Solomon's Temple and the Sepulchre of Christ, Calvary, the Mount of Olives, the Pool of Siloam, and Bethesda are of perpetual interest. At Easter there is an unusual influx of visitors. The inhabitants carry on extensive trade in rosaries, and crosses of olive wood, and other trifles offered as mementos.

During a summer day, the narrow streets are described as hot, stifling, noisy, —crowded with loaded camels and donkeys. There are long rows of small, dark shops. The owners squat in Turk fashion and offer their wares. At night the gates are closed; the hubbub ceases and gives way to a stillness as of the grave. The streets are not lighted, but in season the moon comes out and shines as it shines only in Judea.

During the summer the elevated situation of the city and the prevalence of the sea breeze from the Mediterranean render life endurable. At this season the population betakes itself to the housetops to sleep. In winter there are occasional falls of snow, lasting for a few days at a time. A parching desert wind from the east renders Jerusalem a very undesirable place of residence in the month of May.

See JEWS; PALESTINE; GETHSEMANE.

Jester, a person maintained by a monarch at court to pass away the time with jests and sharp sayings. Alexander the Great and others of the ancients are said to have maintained jesters. During the Middle Ages the fool was a regular attendant of monarchs and the nobility. His traditional dress was distinguished by mock emblems of royalty. He carried a fool's scepter in his hand, and, in place

of a crown, wore a fool's cap of gay colors, ornamented frequently with jingling bells and a pair of ass's ears. He also wore a broad collar, not infrequently wide enough to serve as a cape. His lower person was clad in hose, with long, upturned toes. The fool was often a person of unusual shrewdness, who, by standing at his master's elbow, was able to help him out of many a hard scrape. If he thought his master about to part with money too readily, he would be able to suggest that a fool and his money were soon parted. Not infrequently the fool was really a controlling mind in matters of great importance. He was supposed to have very little mind, but to speak it freely on all occasions without danger of reprimand or punishment. Wamba of Scott's *Ivanhoe* is an interesting character of this sort.

Jesuits, jĕz′ū-ĭts, a religious order of the Catholic Church. The members bind themselves to lead lives of purity, to renounce all personal possessions, and to yield obedience to their superiors. The order was founded at Paris by an enthusiastic Spanish nobleman, Ignatius Loyola, who had been disabled in battle and was studying for the priesthood. August 15, 1534, Loyola and six companions, five of them countrymen and one a Portuguese, met in the crypt of a chapel on Montmartre and bound themselves by vows for life. Three Frenchmen were soon admitted. The name chosen was Company of Jesus, in reference to the military form of organization. The popular name of Jesuits was given later, it is said, by Calvin.

The organization of the Jesuits differs from that of other Catholic orders in that, instead of wearing habits and retiring within walls of monasteries for reflection, the Jesuit dresses like other men and, at the command of his superior, accepts positions that bring him into immediate contact with the world. The Jesuit is no recluse, but an active agent. He is forbidden to accept independent office. He may not become an archbishop or cardinal, but he may act as a secretary, librarian, confessor, nurse, missionary, teacher, professor, or college president; in short, he may occupy any honorable position that promises opportunity to win converts to the Mother Church. Perhaps no better idea of the many-sidedness of the Jesuit can be given than by quoting a famous sentence from Macaulay:

> In spite of oceans and deserts, of hunger and pestilence, of spies and penal laws, of dungeons and racks, of gibbets and quartering blocks, the Jesuits were to be found under every disguise, in every country; scholars, physicians, merchants, servingmen, in the hostile court of Sweden, in the old manor houses of Cheshire, among the hovels of Connaught, arguing, instructing, consoling, animating the courage of the timid, holding up the crucifix before the eyes of the dying.

The Jesuits were organized at the time of the Protestant Reformation. They are credited by friend and foe alike with having stayed Protestantism within its present limits. It is difficult, especially when the bitterest opponents of the order have been jealous members of the same church, to separate calumny from fact; but without doubt the Jesuits saved Bohemia to Catholicism and drove the Huguenots from France.

The order is preëminently a body of missionaries. Missions were opened among the Five Nations of New York. At one time 3,000 Hurons were under the civilizing influence of the church. Father Marquette, the explorer of the Mississippi, was a Jesuit missionary. One of Parkman's interesting volumes is a history of the *Jesuits in North America*. The Jesuits founded missions among the Indians of South America and carried the cross throughout India and beyond the Himalayas into Tibet. Francis Xavier, one of the founders of the order, introduced Christianity into Japan and his followers established missions still existing in China.

The order has been noted for scholarship. A mere catalog of Jesuit writings fills several volumes. Philosophy, theology, history, philology, art, literature, science —in short, every department of learning —is represented. A complete system of Jesuit schools was evolved, extending from the child's school to the college. Bacon declared, "never has anything more perfect been invented." Compayre, the French pedagogist, dubbed it, "a mere system of memorizing." It is but justice to state, however, that the Jesuits evolved a system out of chaos, and set modern education on its way.

One of the ways in which the society obtained a powerful hold on Europe was the education of future princes, popes, prelates, professors, and writers. Voltaire was educated in a Jesuit school. He turned his sharpened wit against the order. Realizing that it was one of the bulwarks of the Catholic faith, he declared, "Destroy the Jesuits and we shall make an end of the beastly church." Descartes, Tasso, Buffon, Condé, Corneille, Canova, and Wallenstein were educated in Jesuit schools. As teachers the Jesuits were noted for thorough preparation and definiteness of aim.

As stated, the order has been the subject of jealous opposition. One pope was induced to order its suppression. It has been suppressed in Catholic France as well as in Protestant Germany. The society has always been noted for able, active, membership, with capacity for public affairs. The presence of a force of restless intellectual men of this sort, to whom intrigues could be imputed by Protestant and Catholic alike, accounts for much of the long standing injustice done the Catholics of Great Britain and Ireland. This view of the Jesuits is stated by the phrase, " a naked sword whose hilt is at Rome and whose point is everywhere."

The first general of the order was Loyola. There have been in all twenty-three generals. Oddly enough, though the Jesuits were organized in France, a Frenchman has never been at the head. At the present time, there are between 15,000 and 20,000 Jesuits. About 2,000 reside in the United States, engaged in mission work among the Indians and the management of numerous schools and colleges. Baltimore, St. Louis, and Montreal may be called American centers of the order.

See GALILEO; CATHOLICISM.

Jesus Christ, the founder of the Christian religion. The name Jesus is the Latin form of the Greek Jesous, which, in turn, is identical with a name common among the Jews, appearing in various forms, as Jehoshua, Joshua, and Jeshua. The name means "Jehovah is salvation." The word "Christ" is Greek and means "the anointed one," the Hebrew equivalent being "Messiah." It is not a name, properly speaking, but a title, and is used in the New Testament with the article preceding it, as, "Jesus the Christ." The fact that the title "the Christ" developed so quickly into a name testifies to the strength of the conviction that Jesus was indeed the Messiah, the Deliverer, for whose promised coming the Jews had long waited.

Practically all that is known of the life of Jesus is told us in the familiar account of the four Gospels. From his birth in the little town of Bethlehem, when the angels sang together and the Star lighted the way to the manger that "cradled a King," through the twelve years that we may call his childhood, the eighteen years of his youth and early manhood, the three short, full years of his public ministry—the story takes us to the time of his accusation, his illegal trial, and his shameful death, when the sun's light failed, and the "earth did quake," and the "veil of the temple was rent in twain from the top to the bottom." All four Gospels give the story of the resurrection, recording ten different appearances during forty days' time. Paul tells us that Jesus was seen after the resurrection by 500 witnesses. At the time of the last of these appearances his disciples followed him to Bethany where he gave them his last commands and blessed them, and "a cloud received Him out of their sight."

To this story of the Gospels may be added a few points of which we can be reasonably certain. Such, for instance, as that in his childhood he was taught the Old Testament Scriptures. All Jewish children in religious families learned such lessons. He must have been a close observer of nature, for his teachings are full of illustrations from that source. So, also, we know that he watched and studied men; no one ever knew human nature better, nor was more familiar with the habits of his time. He spoke both Greek and Aramaic, at that time used almost universally in Palestine. After he reached manhood he worked as a carpenter until he was thirty years old. Thus from inference and from profane history we can gather facts to help make this wonderful life seem more real to us. The whole story is one of a man commonplace so far as his habit of life went, a plain village carpenter

who came "eating and drinking," leading a quiet life, obedient to the Mosaic law, making no pretentions, and teaching—when his years of teaching began—the unlearned and the humble. "The common people heard him gladly" we are told. Yet in the words of Canon Farrar, "He has, as a simple matter of fact, altered the whole current of the stream of history. He closed all the history of the past and inaugurated all the history of the future, and all the most brilliant and civilized nations of the world worship him as God." It was the sinless life of Jesus, the Christ, which gave power to his personality and authority to his utterances. No other of the world's great teachers has reached, nor has claimed to have reached, the beauty of a blameless life. Although he was surrounded by all the temptations common to humanity, friends and critics alike admit with Pilate that "they find no fault in him," and in all these two thousand years no philosopher has discovered fallacy of any sort in his pure and simple teachings, which, centered as they are "in the two great truths of the fatherhood of God and the brotherhood of man," lie at the foundation of all that is best in the progress of the world.

If the life and death of Socrates are those of a sage, the life and death of Jesus are those of a God.—Rousseau.

He is the highest object we can possibly imagine with respect to religion, the Being without whose presence in the mind perfect piety is impossible.—Strauss.

The Christ of the Gospels is the most beautiful incarnation of God in the most beautiful of forms.—Renan.

Alexander, Caesar, Charlemagne, and I, myself, have founded great empires; but upon what do these creations of our genius depend? Upon force. Jesus alone founded his empire upon love, and to this very day millions would die for him.—Napoleon.

Jet, a peculiar form of pitch coal. It is a solid, black, dry, inflammable substance. It occurs as a mineral in veins of lignite coal. When first mined jet may be carved and turned readily into toys, buttons, and articles of ornament. It takes a high polish. The finest jet in the world is found in a vein twenty feet thick at Whitby, Yorkshire. The monastery of Whitby did a thriving business in jet rosaries and crosses when that shrine was a resort of pilgrims. Other fine veins are found in the provinces of Aude, France, and Asturias, Spain. The original jet quarry was in Asia Minor. The Greek name, of which jet is a corruption, was *gagates.* Jet was prized highly by the ancients and is still the appropriate jewelry of mourning, though cheap imitations in glass render genuine jet ornaments less desirable. Its deep lustrous black has made jet a familiar standard of comparison. Milton speaks of the "pansy, freaked with jet," and Scott, of the black-cock's "jetty wing."

Jetsam, goods thrown overboard at sea to save the ship. When a portion of a cargo is cast overboard to save a ship from foundering, or to enable it to escape from the enemy, the loss is distributed among the various owners of the cargo in proportion to the value of their shipments. Those whose property is saved are required to make up a part of the loss of him whose property is sacrificed for the general good. This is an old law of the sea.

Jette, Sir Louis Amable (1836-), a Canadian jurist and statesman, was born at L'Assomption, Quebec, and educated at L'Assomption College. After studying law he was called to the bar in Quebec in 1857, beginning practice in Montreal. Sir Louis became a contributor to various political journals, and was for a time editor of *L'Ordre,* Montreal. After rising quite high in his profession, he entered politics in 1872 securing election to the Dominion House of Commons as a Liberal for Montreal East, serving for six years. In 1878 he was appointed professor of civil law at Laval University, later becoming dean of the law faculty. For twenty years, 1878-98, Sir Louis was a puisne judge of the superior court of Quebec, and lieutenant-governor of that province from 1898 to 1908. In the following year he was appointed chief justice of the Court of King's bench, and was a member of the Commission for the Revision of the Civil Code of Quebec.

Jetty, an embankment constructed in shallow water at the mouth of a river and parallel with the current, for the purpose of narrowing the stream and causing it to scour out a deeper outlet. Many noble

rivers spread out so wide and are so shallow at their mouths that deep draught ships cannot enter them. By confining the current within artificial banks its scouring capacity is increased and a deeper channel is secured. Sometimes one jetty is sufficient, but ordinarily double jetties are built, one on each side of the outlet. Double jetties have been found useful in harbors where the incoming and outgoing tide may be made to scour a deeper entrance. The mouths of a number of rivers in Europe and America have been deepened in this way. The Neva at Petrograd has been improved by jetties. The Oder has been deepened from four to thirteen feet; the Vistula, from seven to twenty-three, and the Danube, from eight to twenty-one feet.

In 1875 Congress authorized Captain Eads to construct a system of jetties at the mouth of the Mississippi. The south pass, the central of the three great channels by which the delta is traversed, was chosen. He decided to build two parallel dikes, running a distance of about two miles to deep water. Piles were driven in long rows to mark the lines of the proposed dikes. Willow brush in full leaf, cut fifteen feet in length, was made into huge cribs or mattresses 100 feet long by fifty feet wide, and two feet in thickness. They were built on shore, towed to place, and then sunk by loading them down with rocks. A second, a third, and a fourth tier, each narrower than the preceding one were sunk in like manner. The silt of the river, which is a yellow flood in its lower course, soon settled in the mattresses and made two solid watertight walls between which the current, now comparatively narrow and correspondingly swifter, scoured out the channel.

Jewelry, costly personal ornaments of gold, silver, enameled ware, and the like, usually adorned with precious stones. As produced today it consists chiefly of machine-made articles, often beautiful in design but lacking the artistic touch seen in the hand-made ornaments of ancient and medieval times. Of late years such schools as Pratt Institute, New York, whose students in the department of fine arts have produced very beautiful hand-made jewelry, have done much to revive the art of jewelry making. This is a commendable step, for its proficiency in the art of making jewelry is a test of a nation's artistic development. A jeweler must produce the largest amount of beauty within the smallest space.

The use of jewelry is as old as civilization. Some of the ancient Egyptian work resembled greatly the Chinese cloisonné of today; that of the ancient Greeks was notable for its purity and simplicity; while that of the old Romans was more ostentatious but of less exquisite workmanship. The Renaissance produced masters in jewelry-making as it did masters in every other art. Foremost among these great jewelers were Benvenuto Cellini and Albrecht Dürer.

The modern period is characterized by a simpler and more graceful method in mounting gems and in the designing of jewelry. During the nineteenth century the diamond was the stone in high favor; now it has made way for the pearl. For many years the jewelers of London and Paris, and the gem-cutters of Holland held first place, but now American workers have won a name abroad. The quantity of gaudy jewelry sold today is an unfortunate reflection on popular taste. Nothing bespeaks poorer judgment as to the eternal fitness of things than the wearing of such spurious jewelry, unless it be expensive jewelry worn out of place.

See GEM.

Jewett, Sarah Orne (1849-1909), an American novelist and writer of short stories. She was born in South Berwick, Maine, and began contributing to the *Atlantic Monthly* when about twenty years of age. Among her books may be mentioned: *Deephaven, Country Byways, A Marsh Island, A Country Doctor, Betty Leicester, The Story of the Normans, The Life of Nancy, Betty Leicester's Christmas,* and *The Country of the Pointed Firs.* Her stories are delicately drawn pictures of New England. "Her books are alive with the fragrance of the woods, the murmur of pines, the lilt of the ebbing tide in the lush sea grass, and the simple occupations of homely country folk."

Jewish Literature. See LITERATURE.

Jews, Israelites or Hebrews. A Semitic people related to the Chaldeans and the

Arabians. Tradition derives their descent from Abraham and the patriarchs. The story of Abraham, of Isaac, of Jacob, and the twelve sons of Israel, is familiar to the reader of the Old Testament. There were twelve tribes, one for each son. According to the Biblical account they were a pastoral people. During a season of famine they sojourned in Egypt, where they were enslaved and forced to work at grievous tasks, making "bricks without straw." They were rescued and brought forth by Moses, their great leader. They were led by a cloud. They crossed an arm of the Red Sea dry shod and wandered for forty years in the wilderness. At Sinai they received the ten commandments written on two tables of stone. Finally they reached Palestine, the Promised Land, flowing with milk and honey. They dispossessed in part the original inhabitants and settled down, raising the olive and rearing cattle and sheep.

The Jews lived for a time under a form of church government, Aaron being their first high priest. Eli, Samuel, and Elijah were judges. Then came a monarchy. Saul, David, and Solomon were the most noted kings. Jerusalem was taken from the Jebusites and converted from a small fortress into a walled city. The Ark of the Covenant, the sacred symbol of their religion, was placed at rest in the temple built by Solomon, the favorite son of David. The Hebrews got on well with their sea-coast neighbors, the Phoenicians, but their country lay in the great highway between Egypt and Babylon. It was impossible to avoid entanglement in the wars between these nations. The kingdom of Solomon was divided into two rival peoples, the ten tribes of Israel and the kingdom of Judah. Both were carried away into captivity, the Ten Tribes to Nineveh, Judah and Benjamin to Babylon. The former have never been heard of since. Judah, whence the name Jews, was permitted, with Benjamin, to return to Jerusalem and rebuild the ancient city.

The birth, life, and suffering of Christ belong to the latter part of this period. In 70 A. D. Jerusalem was taken by storm by the Romans and reduced to ruins. Its very name was changed. The Jews were forbidden to set foot on the site of their ancient city and were commanded to disperse. Since that time the Jews, as a nation, have had no history. They have followed the advances of trade into all parts of the earth. The *American Israelite* gives 15,430,000 as the total number of Jews, allocated in part, as follows:

Poland	3,300,000
Ukrainia	3,300,000
United States	3,100,000
Russia	900,000
Rumania	650,000
Germany	540,000
Hungary	450,000
Czecho-Slovakia	450,000
British Isles	300,000
Austria	300,000
Lithuania	250,000
Jugoslavia	200,000
France	150,000
Greece	120,000
Palestine	100,000

For centuries the Jews were forbidden to own land. Their property was literally at the disposal of the spoiler. A Jew might hope for no redress in a court of law. Shakespeare's *Merchant of Venice* shows very clearly how little justice the Jew might expect at the hand of the Christian. Zangwill's *Children of the Ghetto* describes the Jews in London. In the days of the Inquisition, Jews were expelled from Spain, and they have been all but driven out from other countries time and again. After centuries of oppression they are now fairly secure in their rights as citizens in all Protestant and Catholic countries. In countries adhering to the Greek church, and especially in Russia, where the people have a grudge against them as money-lenders and foreclosers of mortgages, the Jews have been frightfully mistreated.

It has long been the dream of the orthodox Jew that some time his people might be united as a nation in the Holy Land. The breaking of the yoke of Moslem control gave great impetus to the idea and the year 1918 recorded much progress in the Zionist movement. A notable event of the year was the organization of the Jewish Legion for Palestine. Twenty-five thousand young men—10,000 from the United States—answered the call, and went forth to help redeem their ancestral land. The United States added nearly 90,000 new members to its Zionist organiaztion. Eng-

land sent a commission to Palestine, which accomplished much in systematizing the educational, industrial and cultural life of that country, and notwithstanding the miserable poverty of the Russian and Polish Jews, they raised enormous sums to aid in the work. From those countries where the Jews were most persecuted a very great emigration set in to America. A period of 20 years saw nearly 1,000,000 landed at New York, Philadelphia, and Baltimore. New York has more Jews than any other city of the world. In this country, they are tailors, peddlers, merchants, manufacturers, physicians, teachers, money changers, bankers, and traveling salesmen. But, although the cattle on a thousand hills were Abraham's, and David tended his father's sheep at Bethlehem, the Jews are seldom, if ever, gardeners, farmers or stock raisers. In America, at least, they are never beggars. The church cares for its own needy. In New York City, out of a Hebrew population of 500,000, possibly but a score of Hebrews, ineligible for one reason or another to their own institutions, are supported at public expense. The Hebrews maintain orphan asylums and homes for aged and infirm in the leading cities of the country.

In the cities of Continental Europe the Hebrews live in a quarter of their own, known as the Ghetto (Gĕt'tō). They build their synagogues without soliciting outside help. They keep the seventh day, that is to say, Saturday, as the Sabbath. Their clergy are known as rabbis. They are strongly Unitarian in belief, regarding Christ merely as an illustrious Jewish teacher. They seek no proselytes, they practice circumcision, reject pork as unclean, and eat no meat not killed under the immediate inspection of their own rabbis. Slaughter houses arrange special hours when the rabbis come to slaughter animals for the Hebrew meat shops.

In addition to having given the Bible and Christianity to the world, the Jews are entitled to respect for their contributions to music, the sciences, and general literature. In music, finance, and statesmanship, they are represented by such names as Mendelssohn, Rothschild, and Disraeli. The true Jew desires that his people shall remain always apart from the world—a sect by itself. The greatest care is taken to bring up children right and to prevent intermarriage with the Gentiles, as all people of the outside world are called. People believe that ultimately the Jews will become merged in the great family of nations. Hebrew is still the language of the Jewish home. For commercial purposes the Jews acquire the language of the country in which they live.

See JOSEPHUS; JERUSALEM; PALESTINE; BIBLE; JUBILEE, YEAR OF; DAVID; ABSALOM.

Jew's Harp, a small musical instrument, a favorite with boys. It consists of a thin tongue of tempered steel with a U-shaped frame, except that the ends of the frame are brought nearer together and prolonged. It is played by placing the ends of the frame against the teeth, while the tongue is set in play by striking the free end with the finger. Shades of intensity are produced by varying the current of the breath. Changes of pitch are produced by changing the cavity of the mouth, which serves at once as a sounding board and as an organ pipe. The origin of the instrument, as well as the origin of its name, is in dispute.

Jigger, or **Chigre,** a small flea found in the West Indies and South America. The female burrows under a person's skin, especially beneath the skin of the foot. At first a slight itching is the only indication of the insect's presence, but the jigger's abdomen soon swells up with eggs to the size of a pea, and a painful ulcer is formed in which the colony of young jiggers make a temporary home. Rubbing the exposed parts of the body with tobacco leaves is regarded as a preventive. In the South the same name is applied to the unrelated harvest mites which attach themselves like ticks to the human body and make painful red swellings or "jigger bites."

Jimsonweed, a well known rank, ill-scented annual, two to five feet high, belonging to the potato family. It has yellowish green, leafy, much branched stems, bearing a profusion of large white funnel-shaped flowers about three inches in length. Both the leaves and seeds are medicinal, being used principally in cases of asthma. Children are occasionally poisoned by eating the seeds. The name is derived from Jamestown, where the plant was originally

introduced with other weeds from Europe. It is known to the druggist as stramonium. About 100,000 pounds of dried leaves are imported annually. It is exceedingly common in the old fields of Virginia and elsewhere, chiefly in the South, but foreigners gather the leaf at less expense.

Jingo, in British politics, a name applied to men or a party desirous of engaging in a foreign war. The term acquired this meaning during the political campaign of 1877, when there was loud talk in England of war with Russia on behalf of the Turks or really for the custody of the Hellespont. A favorite campaign doggerel of the conservatives was the following:

> We don't want to fight;
> But, by jingo, if we do,
> We've got the ships,
> We've got the men,
> We've got the money, too.

The term "Jingo" is now applied in any country to those whose patriotism consists mainly in threatening other countries.

Jinrikisha, jĭn-rĭk′ĭ-sha, a chair cart much used in Japan. The name means man-power-carriage. It is a small, two-wheeled, hooded conveyance. The body is a basket, constructed of wood or light bamboo, resting on springs. The jinrikisha is drawn by a man. It is said to have been invented by an American missionary. The jinrikisha takes the place in Japanese cities that the horse, cab, and hansom occupy in European and American cities. The jinrikisha men stand in rows at piers, wharves, and curbstones, shouting for fares. For long journeys into the interior two or more men are employed. They run, one in front of another, and pull by means of a rope. One relay of men may be exchanged for another, just as the horses for the old-fashioned stagecoach were changed. Jinrikisha men charge about ten cents an hour.

Jiu-Jitsu, jo͞o-jĭt′so͞o, or **Ju-Jitsu,** the Japaness art of self-defense. The word means "the gentle art," for no weapons are used in jiu-jitsu. Formerly the art was kept secret, and confined to the soldier class of Japan, but now its value for general training having been recognized, scarcely a Japanese can be found without at least an elementary knowledge of it. The principle of the system is merely to turn an opponent's strength against himself by a simple, well-directed movement requiring but slight exertion. In order to master it one must acquire a practical knowledge of the position of the nerves, joints, and muscles; quickness, suppleness, and presence of mind. The practice of jiu-jitsu itself is good training in these things, as it is unquestionably one of the best systems of physical training known. In the Chinese campaign of 1900, Japanese troops could out-march American troops by half,—and the American soldiers stood second in point of endurance. *Japanese Physical Training* by H. Irving Hancock describes jiu-jitsu in full.

Joan of Arc or **Jeanne d'Arc,** zhän-dark, the French national heroine. She was born in the forest of Domremy January 6, 1412. She was an illiterate girl, the daughter of a peasant. At this time the English were in possession of northern France. Henry VI of England, with the help of his grandmother, Isabella, was striving to dethrone his uncle, Charles VII of France. Joan claimed to hear heavenly voices commanding her to liberate her country from the foreign invader. She made her way to the French camp. Though at first regarded as insane she was intrusted finally with the leadership of an army. In male dress, and protected by armor, she bore a sword and a sacred banner at the head of her troops and raised the siege of Orleans. She was known henceforth as the Maid of Orleans. Such was the enthusiasm for her leadership that the French troops were everywhere irresistible. Charles retook Rheims, and, as had been the wont of his ancestors, was crowned king in that venerable city. Joan stood by his side during the ancient ceremony. She then desired to return home, considering her mission fulfilled, but was persuaded to remain. The French arms were now less successful. In a battle with the troops of Burgundy, now allies of the English, she was taken prisoner and was surrendered by the duke to England. To the everlasting disgrace of the English name, she was tried for witchcraft. The English clergy, at that time Catholic, urged on the trial. May 30, 1431, she was burned at the stake in a public square in Rouen, and her ashes were thrown into the

JOAN OF ARC LISTENING TO THE VOICES
From the Painting by D. Maillart

Seine. Her humble birth, heroic life, no less heroic death, and pure character have formed the theme of many a writer. The most noble monument to her fame is without doubt Schiller's drama, *Die Jungfrau von Orleans.* In justice to the Catholic church it should be stated that her memory was afterward vindicated fully by a papal bull, and in 1909, she was beatified by Pius X. The place of execution is now marked by an inadequate monument consisting of a paltry figure surmounting a fountain. Without a doubt the school children of France whose heroine she is, will one day erect a fitting memorial. See ROUEN.

Job, a "man in the land of Uz" whose history is related in that book of the Old Testament which bears his name. This book, whose author is unknown, and for which no date can be given, is the "most splendid creation of Hebrew poetry," and ranks among the greatest poems of literature.

The book of Job consists of five distinct parts: a prologue or introduction, the discussion between Job and his friends, the interposition of Elihu, who has been a silent listener to the discussion, the Voice out of the whirlwind, and the epilogue. Prologue and epilogue are in prose; the other parts, although the common versions print them in prose form, are poetry of the highest type.

The prologue describes a scene in Heaven where the sons of God present themselves before Him. Satan, the adversary, advances the theory that Job is righteous because God had given him wealth, family, happiness and health, and he hints that should these favors be withdrawn, Job would sin like other men. Jehovah consents to the testing of Job's loyalty, and one after another his blessings are taken from him. He is stripped of his wealth and his children and is afflicted with a loathsome disease, yet Job bears his afflictions without complaint.

In the midst of his troubles Job's three friends come to discuss with him what they believe to be the cause of his suffering. They tell Job that he has sinned and that he can hope for no relief until he becomes submissive to God. Through a long discussion, Job maintains his innocence and calls upon God to solve his problem for him. Elihu suggests that Jobs suffering is given as a warning rather than as a punishment. While he speaks a storm is rising, "spreadings of clouds, the thunderings. And now comes the climax of the story as Jehovah speaks out of the whirlwind to show Job that he has but to trust the All-powerful, whose purposes he may question but may not hope to understand. He does this in a series of ironical questions by means of which man's weakness is compared to the omnipotence of God.

"Hast thou commanded the morning?"
"Hast thou entered into the springs of the sea?"
"Canst thou bind the cluster of the Pleiades
Or loose the bonds of Orion?"
"Canst thou lift up thy voice to the clouds
That abundance of waters may cover thee?"
"Hast thou given the horse his might?"
"Hast thou clothed his neck with the quivering mane?"
"Is it by thy wisdom that the hawk soareth
And stretcheth her wings toward the south?"

The implication is that if Job thinks himself capable he may "gird up his loins like a man," and take the power in his own hands. Job is humbled, realizing that he has questioned things "too wonderful."

"I had heard of thee by the hearing of the ear;
But now mine eye seeth Thee," he exclaims.

In the epilogue Job's friends are rebuked. Then his health is restored, wealth in double measure is given him, children are born to him. "In all the land were no women found so fair as the daughters of Job. And Job lived to see his "sons' sons unto four generations. So Job died being old and full of years." The book enlarges man's views of the providence of God.

Dr. Richard G. Moulton has published a little volume entitled *The Book of Job,* in which he presents the poem in the dramatic form which seems to belong to it, with an explanatory introduction and notes which elucidate what is difficult and lead to an appreciation of the poetry.

Joffre, sho′ fr′, **Joseph Jacques Cesaire,** (1852——), a French military officer, hero of the First Battle of the Marne, was born at Riversaltes in the Eastern Pyrennes, of humble parentage. He was a hard worker in the military school but showed no brilliancy. He took part in the defense of Paris in the Franco-German War in 1870, and later was made lieutenant in the engineer corps. His advancement was slow but steady and due solely to hard work. He was decorated for services in Formosa in 1885, and in the next five years constructed a railroad in the Soudan, took part in the capture of Timbuktu and constructed the fortifications at Madagascar.

When Joffre was made commander-in-chief of the French army in 1911 he was but slightly known, and at the outbreak of the Great War in 1914 only a few had heard of him, but the military strategy he displayed in turning the German advance into a rout won for him the admiration of the world. In 1906 Joffre resigned his command and was made Marshal of France, receiving the highest military rank the French government can confer.

In 1917, in company with a number of other eminent Frenchmen, Joffre visited the United States on an official mission relating to the war. The company proceeded westward as far as Chicago and Saint Louis, and wherever Joffre went he was hailed with the greatest enthusiasm. In 1919 he was made a member of the French Academy, receiving one of the highest civil honors that can be conferred on a Frenchman. He is an illustrous example of a man possessing great reserve power.

Johannesburg, South Africa, is in the Transvaal Province, and is the largest city and the commercial metropolis of South Africa. It is situated 5,735 feet above sea level, and is 35 miles south of Pretoria, with which it has rail connection. It is also connected by rail with Delgona Bay, East London, Port Elizabeth and with Cape Town, 957 miles away. Although it was the site of only a few shacks as lately as 1886, it is now a modern city, with paved street, street railways, parks and sanitation system, and it is the commercial center of the famous Witwatersrand gold fields. Memories of former Boer dominion are kept alive by a huge dismantled fort that overlooks the city, and by a monument in a suburb, erected in commemoration of the declaration of Boer independence in 1880. The city was taken in 1900 by Lord Roberts, during the Transvaal War. In 1918, this city had a population of 237,106 of whom about one-third were white.

John (1167-1216), king of England from 1199 to 1216, usually remembered as the signer of the *Magna Carta,* or Great Charter, the first great doctrine embodying the principles of English liberty. He was the youngest son of Henry II. By his father, John was called *Lackland* because he was given no portion when Henry divided his domains among his elder sons. In 1177 John was given the lordship of Ireland and went over to take the reins of government in 1185. But he ruled so badly that he was recalled in six months. John united with his brothers in frequent rebellions against their father. Richard I, John's brother, succeeded to the throne upon the death of Henry II, and when Richard died in 1199, John ascended the throne. His French provinces rebelled against him, but he recovered them. John quarreled with the Pope in 1205 over the election to the see of Canterbury. John objected to Stephen Langton, the papal nominee, and in 1211 Pope Innocent III issued a bull deposing John. Outraged by their king's arbitrary rule, the nobles revolted, and on June 15, 1215, John was forced to sign the *Magna Carta.* From the Pope, John obtained an edict annuling the Charter. He raised a mercenary army and opened a war on the nobles. The nobles called over the Dauphin of France to be their leader, and in 1216 Louis arrived in England. But before much was accomplished by either side, John fell ill and died.

John, the name borne by no less than twenty-three popes, the first of whom reigned from 523 to 526, and the last from 1410 to 1415. Only five of these popes are of historical interest.

John I succeeded Hormisdas, and was

in the chair from 523 to 526. In the latter year he was thrown into prison at Ravenna by the Arian king of Italy, Theodoric, and died there.

John XI (931-936) also died in prison. He was chosen pope when only 25 years old. He, with his mother, was imprisoned in 936, and both died there.

John XII (955-964) was elected pope when only eighteen years old, and was the first of the popes to change his name upon election, his name having been Octavian. At the time of John's accession, Berenger was dominating Italy, and the pope sought the aid of Emperor Otho I, crowned him, and was thus soon delivered of Berenger. He later turned against Otho, but was deposed by him in 964.

John XXII (Jacques D'Euse) was a learned, zealous theologian and physician who ruled from 1316 to 1334. His reign was marred by almost constant conflict with the Cordeliers, whom he wished to suppress, yet he had time and energy for founding several abbeys and for writing numerous works on medicine.

John XXIII (Balthasor Cossa) was a member of a noble family of Naples, and was elected pope in 1410. Opposition to his elevation resulted in his convening the Council of Constance, by which he was later deposed and imprisoned in 1415. He was released in 1418, and was compelled to acknowledge the election of his successor, Martin V.

John III, or John Sobieski (1624-1696), a king of Poland and one of the greatest warriors of the 17th century, was born at Olesko, Galicia, and was very carefully educated. John served his country with high courage against Russian, Swede and Transylvanian, and succes fully kept the Turk out of western Europe. He preserved the national integrity of Poland, and in 1667 was honored with the appointment as commander-in-chief of the Polish forces. The two most important battles of his career were fought against the Turks—the battle of Khotin in 1673, and another during the siege of Vienna in 1683. In 1674 the proud and grateful Polish people crowned John and his wife king and queen of their country.

John the Apostle, one of the twelve apostles, commonly believed to have been the "beloved disciple" and companion of Jesus, and the author of the New Testament books known as the *Gospel of John,* of the three *Epistles of John,* and of the book of *Revelations.* John and his elder brother, James, with their father, Zebedee, were fishermen on the sea of Galilee. They had heard the preaching of John the Baptist along the Jordan, and when Jesus called the brothers, they gladly left their work and followed. Under the guidance of Jesus, John and James overcame their defects of character, headstrongness and impetuousness, and became strong and calmly noble. John was one of the three who witnessed the raising of Jairus' daughter and saw the transfiguration; and he was with Jesus in his hour of trial in the Garden of Gethsemane. John witnessed the crucifixion, and at the cross Jesus charged the Apostle with the care of his mother Mary. John returned to his trade for a time, but after the Pentecost he engaged in missionary work with Peter. John and Peter were imprisoned by the Jewish authorities. They held firm in their faith, however, and went to Samaria upon their release, continuing as missionairies. John stayed at Jerusalem during the persecutions, supporting the new church with a beautiful faith. He spent most of his later life in Asia Minor. The works ascribed to John were all written during the latter part of the Apostle's life.

John the Baptist (5 B. C.—A. D. 28), the prophet and immediate forerunner of Jesus Christ. During two years of active ministry The Baptist prepared the people for the coming of Christ, and finally pointed Him out to them. He was born in the hill country of Judah about six months before the birth of Christ, and lived in seclusion until A. D. 26. He then began his ministry in the Jordan valley, crying, "Prepare ye the way of the Lord." His message was, "Repent." A crisis in the lives of the people was near, and ever he cried "Repent." He baptized many, and soon received the name of *John the Baptist.* Near the close of The Baptist's ministry Christ came to him for bap-

tism. John recognized Him, and proclaimed Him to the people as the Messiah. Soon after this The Baptist was imprisoned by Herod, the Tetrarch of Galilee. He was charged with having calumniated Herod. The vengeful Herodias, wife of Herod, using as her tool her daughter Salome, succeeded in having Herod behead The Baptist.

John Bull, a nickname for the English people. It originated in a satire by Arbuthnot entitled the *History of John Bull.* The satire was intended to cast ridicule upon the Duke of Marlborough, but it gave the cartoonist a name for a whole people. The corresponding American term is Brother Jonathan.

John Doree, a fish of pumpkin-seed shape, found on the European coasts. It weighs about five pounds, and is esteemed in the market for its delicate flesh. A round golden spot on the middle of each side is the basis of a tradition that this is the fish in which St. Peter found the tribute money. Fishermen say the spots were caused by the pressure of the apostle's thumb and forefinger. Read Matthew xvii: 24-27.

John of Gaunt, Duke of Lancaster (1346-1399), an English soldier and nobleman, a personal friend of the poet Chaucer, and the champion of Wycliffe, the reformer, in his contest with the English clergy. John was the fourth son of Edward III of England, and the father of Henry IV. He was born at Ghent, Flanders, whence his name. He served England courageously in the wars against Spain and France, and was created Duke of Lancaster in 1362. John was a staunch patron of art and letters, and the material fortune of Chaucer long depended upon the Duke's career.

John Gilpin, a ballad by William Cowper, published in 1785. It is named for its hero. Lady Austen, a friend of Cowper's, told him the story to arouse him from one of his fits of melancholy. The next day he turned it into poetry.

John Gilpin found its way into all the periodicals of the day, was read to crowded houses in London, and was repeated with equal success on provincial stages. Pehaps it has given as much pleasure to as many people, young and old, educated and uneducated, as anything of the same length that ever was written. It is worthy of remark that this merry ballad was written by a man who at the time seemed himself suspended over an abyss—the flame and darkness of hell, and, while it was convulsing audiences with laughter he was in the depths of despair.—Welsh.

Johns Hopkins University, a celebrated institution of learning, situated at Baltimore, Md. It was founded by Johns Hopkins, who bequeathed over $7,000,000 for the establishment of such a university and a hospital to be connected therewith. The university was incorporated in 1867, several years before the death of the founder, and in 1870 the first board of trustees was created. The work of organization begun, the trustees elected as president Dr. Daniel Coit Gilman, who entered upon his duties in 1876. Johns Hopkins University was one of the pioneers among American institutions in fitting out laboratories for research work, and it has a world-wide reputation for its postgraduate and medical departments. Courses are offered in philosophy and psychology, historical and economic science, physics, mathematics, and other courses customary in universities of the first grade. The university has a splendid library of over 200,000 volumes, and, under the auspices of the university, pamphlets and books on scientific and other subjects are published from time to time. Special courses in certain subjects are given, and a summer school is maintained. A number of valuable scholarships are given in order to encourage students in research work. The annual number of students average about 4,000, and the number of instructors 450. The government is vested in a board of 12 trustees, the president being an exofficio member.

Johnson, Andrew (1808-1875), the seventeenth president of the United States. He was born in Raleigh, North Carolina, December 29, 1808. He died at Elizabethton, Tennessee, July 31, 1875, and was buried at Greeneville. His youth was passed in poverty. During his apprenticeship to a tailor he learned to read. While making a living by trade his wife taught him to write and cipher. He settled at Greeneville, Tennessee, and while managing his shop became interested in local politics. At that time state affairs were managed almost exclusively by certain aristocratic families. John-

son espoused the popular side and assisted in organizing a workingman's party. He possessed no little ability as a platform orator. He was elected to several local offices, served in the state legislature, was sent twice to Congress, and was elected governor of Tennessee. In 1857 he took his seat in the United States Senate. Although elected as a Democrat he was from the first independent. He supported the Homestead Bill, which was opposed by the rank and file of slaveholders. In 1860 he supported Breckenridge for the presidency, yet opposed secession when the issue rose. In 1862 Lincoln appointed him military governor of Tennessee, a position in which he displayed no little tact and ability.

Being a Southern man with Northern views the Republican convention of 1864 nominated Johnson to run with Lincoln for the vice-presidency. Lincoln served but a few weeks of his second term when he fell before the bullet of an assassin. Johnson took the oath of office as president April 15, 1865. The Civil War was over. The great problem before the country was the reconstruction of the Union. Contrary to expectation, Johnson showed a lenient spirit toward the seceding states. A controversy arose at once between him and Congress, which grew more and more bitter as time went by. Johnson favored restoring the states to their former rights with slight formality. Congress, being Republican, desired to impose humiliating conditions, and to render a Republican control of Congress certain for some time to come. One disagreement led to another. February 24, 1868, the House of Representatives passed resolutions of impeachment, the first count being that he had removed Secretary of War Stanton from office and appointed General Thomas in his stead. Party feeling ran high. Chief Justice Chase presided at the trial. On May 16 the first vote was taken. Thirty-five senators voted for conviction, nineteen against. The impeachment was notoriously a partisan affair. As it failed only because a few Republicans had the independence to vote for acquittal, the remark made by a historian of the period seems quite apt: "The single vote by which Andrew Johnson escaped conviction marks the narrow margin by which the presidential element in our system escaped destruction." Johnson served out his term of office. In 1875 he was sent by Tennessee to the Senate. He occupied his seat for a few weeks before his death. Johnson was a man of integrity and no little ability. Like Andrew Jackson, he may have been narrow in his views; but, as time goes by, even staunch Republicans grant that his policy of reconstruction had much to commend it, and concede that the leaders of the impeachment played a sorry part in the affair.

See IMPEACHMENT; TENNESSEE; PRESIDENTS.

Johnson, Emily Pauline (1862-1913), a Canadian poet, daughter of George Henry M. Johnson, a full blood Mohawk Indian chief, and Emily S. Howells, an Englishwoman. Miss Johnson was born on the Grand River Reserve, in the province of Ontario, and was educated by private tutors and at the Brantford Model School. She became passionately fond of literature and devoted herself to writing while still quite young. While on a visit to England in 1894, Miss Johnson published her first book of poems, *The White Wampun*. The book was well received. Later she published *Canadian Born* and *Flint and Feathers,* poetry; and *Shaggan-appi* and *The Moccasin Maker,* fiction.

Johnson, John Albert (1861-1909), an American statesman. He was born on a farm near St. Peter, Minnesota, of Scandinavian parents. When he was but a child his father deserted the family, and the mother, a woman of noble character, was forced to take in washing to support her children. John was the oldest, and at thirteen left school to work in a grocery. Later he was employed by a druggist, and at fifteen induced his mother to stop working for others, and allow him to support the family. Though he never had another day's schooling he studied constantly, but without becoming a drudge, for he entered into all the local activities and was a leader among the young people. In 1886 he became the Democratic editor of the local paper. Twelve years later he was elected to the state senate. In 1904, at the request of both Republican and Democratic leaders, he became the Democratic candidate

for governor, and though Minnesota is a strongly Republican state, was elected by a considerable majority. Two years later he was reëlected by a majority ten times as great. In 1908 he won a third election.

Johnson, Samuel, one of England's most noted men of letters. He was born in Litchfield in 1709. He entered Pembroke College, Oxford, with a reputation for prodigious learning, but he was compelled by poverty to leave before taking a degree. His father was a bookseller, and Samuel was a great reader. He taught in a grammar school. He married a widow twice his own age and spent her little fortune of $4,000 in trying to establish a school of his own. Garrick, the actor, was one of his pupils. In 1737 Johnson moved to London and literally starved for years, trying to earn a living by writing. He wrote articles for magazines and Tory comments on the proceedings of Parliament.

He was a man of huge, unwieldy form, rolling gait, slovenly habits, and far from pleasing table manners. An inherited tendency to scrofula, which affected him from his birth, had impaired his eyesight, distorted his features, and was accountable for the deep melancholy which took possession of him and doubtless for many if not most of his peculiarities. He monopolized conversation, bore down all opposition, and antagonized people recklessly. Goldsmith used to say, "There is no getting on with Johnson: If his pistol misses fire, he knocks you down with the butt of it." He came to London unknown, unbefriended, ragged, untidy; he often walked its streets at night because he was too poor to procure a lodging; he lunched on coarse food because he was penniless; and yet by sheer ability Johnson rose gradually but surely to a recognized dictatorship in a literary world that included such writers as Fox, Gibbon, Burke, and Goldsmith. His services as a political writer, and not as a man of letters, secured him finally a government pension of $1,500 a year, after which he was more comfortable. Before this, he was at times so poor in purse that he was obliged to make his calls of business and otherwise on "clean shirt day," the only day in the week on which he could afford clean linen. Neither he nor his wife seems to have had the slightest ability to make one shilling do the work of two. In 1755 he completed his celebrated *Dictionary* for which he received over $9,000, but the entire amount had been drawn and spent before he finished the work.

Of his writings *Rasselas* is the most popular. The scene is laid in Abyssinia and Egypt, but deals with the never-ending search for happiness. "Answer, thou great Father of Waters," says one of the searchers, addressing the Nile, "Tell me if thou waterest through all thy course a single habitation from which thou dost not hear the murmurs of complaint." It was written in a week's time to pay the funeral expenses of his mother.

His *Dictionary,* already mentioned, is now out of date, but it is a monumental work. It is of first importance as the earliest noted work of the kind in English. It is the forerunner of the dictionaries since published on both sides of the Atlantic. Some of his definitions are so bigoted, not to say spiteful, as to be humorous. That on *oats* is famous: "*Oats,* a grain which, in England, is generally given to horses, but in Scotland supports the people." An offended Scot retorted by inquiring where the learned lexicographer could find such horses as were produced in England or such men as were reared in Scotland. The desk on which Johnson wrote his *Dictionary,* and the original manuscript, are preserved at Oxford University.

Other of Dr. Johnson's works are important. *The Idler* and *The Rambler* were serious, solemn imitations of the sparkling *Spectator.*

His *Lives of the Poets,* a series of biographies, are still read, but only by the student of literature. Johnson's style is dignified and sonorous. He was given to using long words. "His hand is heavy. His step is heavy, but not blundering; his blows are as strong and deft as those of a lion; his voice, loud, but sonorous. His words roll at times like the sound of distant thunder, but they never fall in a light shower. Whether his opinions be agreeable or not, they are couched in dignified language."

Johnson's Life by James Boswell is considered the greatest biography ever written. It runs through several volumes, but is ex-

cellent reading. Boswell's reputation rests wholly on this work, and it is safe to say that Dr. Johnson, despite his great learning, would be known little more than Roger Bacon were it not for his biographer.

Mrs. Johnson died in 1752. Johnson lived for many years in bachelor quarters, but with a room ready for him whenever he chose to occupy it at the home of a Mr. Thrale, a wealthy brewer. In this home he spent much of his time for many years. Mrs. Thrale, a vain but warmhearted woman, surrounded him with comfort and nursed him tenderly in illness. After Mr. Thrale's death the lady made a foolish second marriage which gave Johnson offense, and this home was closed to him. He had at this time a house in Fleet Street. Here he maintained for years several impecunious persons who quarreled outrageously with each other and made their benefactor miserable. Johnson, however, endured it with patience because he pitied them. However quick he may have been to resent an injury or insult from a superior, he was unfailingly kind to inferiors and generous to the poor. Johnson was for many years the center of a literary club, by whom he was regarded with no ordinary degree of affection. In 1784 he died at his lodgings alone, in so far as he was without relatives, but he was attended by affectionate friends. The horror of death which had haunted him throughout his life left him toward the last and he died in great peace. He was buried fittingly in Westminster Abbey.

See BOSWELL; CHESTERFIELD; GOLDSMITH.

QUOTATIONS.

Who drives fat oxen should himself be fat.

Knowledge is more than equivalent to force.

Trade's proud empire hastes to swift decay.

Is not a patron, my lord, one who looks with unconcern on a man struggling for life in the water, and when he has reached ground encumbers him with help?

When a man is tired of London he is tired of life; for there is in London all that life can afford.

Sir, a woman preaching is like a dog's walking on his hind legs. It is not done well; but you are surprised to find it done at all.

He left the name at which the world grew pale,
To point a moral, or adorn a tale.

There mark what ills the scholar's life assail,—
Toil, envy, want, the patron, and the jail.

SAID OF JOHNSON.

A mass of genuine manhood.—Thomas Carlyle.

Johnson, to be sure, has a rough manner; but no man alive has a better heart. He has nothing of the bear but the skin.—Oliver Goldsmith.

The memory of other authors is kept alive by their works. But the memory of Johnson keeps many of his works alive. The old philosopher is still among us in the brown coat with the metal buttons and the shirt which ought to be at wash, blinking, puffing, rolling his head, drumming with his fingers, tearing his meat like a tiger, and swallowing his tea in oceans. No human being who has been more than seventy years in the grave is so well known to us. And it is but just to say that our intimate acquaintance with what he would himself have called the anfractuosities of his intellect and of his temper, serves only to strengthen our conviction that he was both a great and a good man.—Macaulay.

There have been many broader and more scholarly Englishmen, but there never walked the streets of London a man who battled more courageously for what he thought was right.—Halleck.

Johnson, Sir William (1715-1774), a famous colonist of New York. He was a native of Ireland. In 1738 he established himself on a tract of land in the Mohawk Valley, about twenty-five miles from Schenectady. He settled colonists on his estate and opened up an extensive trade with the Indians. The six nations of the Mohawk family became so impressed with his fairness that they adopted him as a member of their tribe. In the war which followed with France they were held by his influence on the British side. They followed his lead in the operations against Crown Point and against Dieskau at Lake George. He took part in the expedition against Ticonderoga, received the surrender of Fort Niagara, was present at the capture of Montreal, and saw the surrender of all Canada. At the conclusion of the war the British Parliament gave him a grant of $25,000 and a large tract of land on the northern side of the Mohawk where the town of Johnstown, named in his honor, now stands. He was a noted man in his day. He lived in baronial style in a large wooden mansion, where he dispensed hospitality to native and white men alike with princely liberality. He started the business of glove making. He introduced sheep and blooded horses into the Mohawk Valley.

Johnson, Tom Loftin (1854-1911), an American political leader. He was born in Georgetown, Kentucky, and passed his early life in that state. He early became interested in street-railways, inventing several useful appliances for them, and later buying a street-railway in Indianapolis; he was also interested in street-railways in Cleveland, Detroit, and Brooklyn. From 1891-5 he was a Democratic member of Congress from Ohio, and in 1901 was elected mayor of Cleveland, to which office he was re-elected in 1903-5-7. No other municipal administrator of modern times has left such a profound impression upon the community he governed. Cleveland under his guidance established farm colonies for criminals, for juvenile delinquents, and for the tuberculous. The 2,300 acres devoted to these purposes have attracted wide-spread attention from sociologists and others. In his city administration Johnson succeeded better in abolishing police grafting and gambling houses than does the ordinary municipal reformer. In order to prepare the way for municipal ownership of public utilities, he demonstrated from the city control of the water supply, that all public industries could be operated on scientific business principles. In spite of charges of extravagance brought against him because of his innovations in the conduct of the city's business, it was proven that not only were these charges untrue, but, on the contrary, municipal affairs were operated more economically in Cleveland than in most other large cities. The most important part of Mayor Johnson's work, however, was in connection with his taxation and street railway policies.

In the first he adopted what is known as the unit system of land valuation, which separates the assessment of land from the assessment of improvements on that land, thus giving a scientific method of arriving at the value of the land itself. He also succeeded in doubling the taxation of railroads and other public service corporations.

Mr. Johnson is probably better known popularly for his determined fight for three-cent street-car fares than for any other one thing. He forced the company to relinquish its watered stock and to limit its profits to six per cent on the rest. After a fierce struggle the three-cent fare was introduced with one cent for transfers. Under that system the business increased from eight to eighteen per cent in a few months. He had other plans for extension of municipal control, but before these could be carried out he died. One sentence spoken by him when he was carrying on a fierce fight for the merit system is significant of the sincerity and sturdy uprightness of the man, "I believe it is good politics; but anyway it is decent."

Johnston, Albert Sidney (1803-1862), an American soldier. He was a native of Kentucky, a graduate of West Point. In 1834 he left the United States army and took up land in Texas. He became connected with the military affairs of that republic, rising from one position to another, until he became Texan secretary of war. He took part in the movement for the annexation of Texas to the United States, and joined the American forces for the invasion of Mexico. Three horses were shot under him at the battle of Monterey. In 1857 Jefferson Davis, his old classmate and a lifelong friend, the United States secretary of war, sent him in command of an expedition to bring the Mormons of Utah to terms. He managed the affair with tact. When the Civil War broke out, Davis, then president of the Confederacy, appointed him to the command of the forces in the West. He was unable to hold Kentucky against Grant, but united his forces with those of Beauregard and struck Grant at Pittsburg Landing, or Shiloh, as the battle is sometimes called. As is well known Grant's army was driven in confusion to the river. In the moment of apparent victory Johnston fell from his horse. A minie ball had severed an artery in his thigh. He bled to death in fifteen minutes. Many critics believe that, if it had not been for his death, Grant's army would have been annihilated before Buell arrived to reinforce him. President Davis considered that he had lost the most brilliant military mind in the Confederacy.

Johnston, Joseph Eggleston (1807-1891), an American soldier. He was born at Cherry Grove, Virginia, and received his education at West Point. At the out-

break of the Civil War he held a position of importance in the United States Army, —that of quartermaster-general, with the rank of brigadier-general, and he had served with distinction in the Black Hawk, the Seminole, and the Mexican Wars. When Virginia seceded, however, he resigned his commission and before long became one of the five generals of the Confederate Army. In the Confederate victory at Bull Run, Johnston took an active part, charging the enemy with the colors of the 4th Alabama in his hands. He had operated against McClellan in the peninsular campaign of 1862, and was wounded at Fair Oaks in May. His wound unfitted him for active service until the following May, when he attempted, but vainly, to relieve Vicksburg, then besieged by Grant. In 1864 he succeeded to the command of Bragg's army, which he led in a masterly retreat before Sherman from Dalton to Atlanta. Johnston finally surrendered to Sherman in April, 1865, at Durham Station, North Carolina. He is regarded on either side as one of the best leaders of the war. Grant said of him, "I have had nearly all the Southern generals in high command before me, and Joe Johnston gave me more anxiety than any of the others." After the war General Johnston engaged in business. In 1876 he served a term in Congress, and in 1885 was made United States Commissioner of Railroads. He is the author of *A Narrative of Military Operations During the Late War.* At the funerals of Grant and Sherman, General Johnston was a pallbearer.

Johnston, Mary (1870-), an American novelist. She is a native of Virginia. She published her first story, *Prisoners of Hope: A Tale of Colonial Virginia,* in 1898. Among her other works are the popular *To Have and To Hold, The Witch, The Wanderers, Hagar, Foes, Michael Forth* and *Sweet Rocket.*

Johnstown, Pennsylvania, in Cambria County, is located on the Conemaugh River about sixty miles southeast of Pittsburgh. It is reached by the Pennsylvania and a branch of the Baltimore & Ohio Railways. The city came into particular prominence in 1889 when, by the destruction of a dam about twelve miles east of the city, it, together with a number of smaller towns in the valley, was practically destroyed, with a property loss of about ten million dollars and a loss of approximately twenty-five hundred lives. The city was quickly rebuilt and is of much greater importance since that time than previously.

The industries of this city are steel making, there being plants of several large companies located here, iron and steel works, furniture factories, potteries, wire works, and woolen and leather factories. There are several public buildings of note, among which are the Cambria Free Library, Conemaugh Valley Memorial Hospital, the City Hall, High School and a number of churches. The city is in a flourishing condition with a population in 1920 of 67,327.

Joliet, jō'lĭ-ĕt, Fr. zhō-lē-ā' (1645-1700), an American explorer. He was born at Quebec of French parentage. He was educated at the Jesuit College of that city, and engaged in the American fur trade. In 1673 he was sent by Governor Frontenac to obtain more definite information relative to the lower course of the Mississippi. He set out with a party of seven, including the adventurous Father Marquette. The party traveled in canoes by way of Green Bay, the Fox, and the Wisconsin. They descended the Father of Waters as far as a point below the mouth of the Arkansas. They returned to Lake Michigan by way of the Illinois and Chicago. Joliet returned to Quebec alone. He lost his journal in the rapids of the St. Lawrence. The world is indebted to Marquette's narration for the details of the journey, which, be it remembered, was 2,500 miles by canoe. The French government granted Joliet the Island of Anticosti in the St. Lawrence. Here he built a stockade, intending to embark in trade with the natives, but in 1691 the British captured his island and destroyed his property. A few years later a grant of land in Canada was made him. Joliet, Illinois, was named in his honor. See MARQUETTE; LA SALLE.

Joliet, Illinois, the county seat of Will County and an important manufacturing city, is situated 40 miles south by west of Chicago on the Desplaines River, the Chicago and Michigan Canal, the Chicago

& Alton, the Atchison, Topeka & Santa Fe, the Rock Island & Pacific, the Chicago, Joliet & Eastern and other railroads. Electric lines connect the city with important towns in Illinois, Indiana, Ohio and Wisconsin. Joliet is the site of extensive steel mills, and the manufacture of steel and its allied products—wire, tinplate, stoves, machinery and implements—constitute the chief industry. Extensive limestone quarries in the vicinity give employment to a large number.

One of the state's penitentiaries, a noteworthy structure of Joliet limestone, is here. Other important buildings include the Federal building, two hospitals, the public library, township high school and the Athenaeum. In addition to the public schools there are the St. Francis and St. Mary's academies. Delwood Park, Highwood Park and Westwood Park are attractive pleasure grounds.

Joliet was settled in 1831 and incorporated in 1845. It is named for Louis Joliet, the French explorer, who with Marquette visited the locality in 1673. The city has the commission form of government. Population, in 1922, 38,442.

Joliette, Quebec, an industrial town and the county town of Joliette County, is on L'Assomption River, thirty-six miles north of Montreal. The city, is served by the Canadian Pacific, Canadian Northern, and other railroads. The manufactories of Joliette produce brewery products, woolens, paper, grist, tobacco products, lumber, knit goods, foundry products, sashes and doors, leather, clothing and other articles. Power for manufacture is generated at the Joliette Falls of L'Assomption and the Shawinigan Falls of the St. Maurice. The educational system comprises seven public schools, a library, a classical college, two academies for boys and girls, and a normal school for girls. Joliette contains a handsome cathedral and a well-equipped hospital. In 1921 the population was 9,113.

Joly de Lotbinière, Sir Henri Gustave (1829-1908), a Canadian statesman, was born at Epernay, France, and educated at Paris. With his parents he removed to Lower Canada where, in 1855, he was called to the bar, practicing in the city and district of Quebec. Elected to the legislative assembly as a liberal, Joly took part in every important debate on confederation, opposing the plan in the belief that under it the interests of the French-Canadians would not be served. After confederation he became the Liberal leader, and until 1874 served the Quebec assembly and the Dominion House of Commons. Retiring from the House in 1874, Joly continued in the assembly, leading the Liberal opposition. Two years later he succeeded to the premiership of Quebec and at once attracted attention by his retrenchment program, designed to put provincial finances on a sound basis. From this position Joly retired in 1879; but from that year until 1883 he was again Opposition leader in the assembly. In 1885 he retired from public life, remaining inactive until 1895, and in 1896 was again elected to the House of Commons. He was raised to the Ministry of Inland Revenue in 1897; and was lieutenant-governor of British Columbia from 1900 to 1906. Queen Victoria conferred upon him the order of K. C. G. M. in 1895.

Jonah, a Hebrew prophet, who lived in the eighth century before Christ, while Jeroboam II reigned over Israel. We are told in II Kings xiv: 25, that Jonah foretold the deliverance of Israel from Syrian oppression. The book of Jonah is in no sense a prophecy, but a graphic story concerning the man himself. Its authorship as well as its contents have been the occasion of much dispute. Jonah is usually regarded as its author, although certain critics believe it to have been produced by a later writer. Some think it should be taken literally, others regard it as purely allegorical.

However these things may be, the story contained a warning to the city of Jerusalem in the account of the wickedness and the repentance of Nineveh, "that great city." The book teaches a lesson also to the individual, as to the nature and power of repentance.

The movement of the story is rapid, almost dramatic. It begins suddenly with God's command to Jonah to go to Nineveh,

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